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ABSTRACT

Articles in these proceedings of a conference of the Council for Programs in Technical and Scientific Communication represent the views of professional communicators and academicians who share a concern for providing breadth and quality of preparation for present and future technical communicators. Among the topics discussed in the 17 articles are the following: (1) the need for new and better texts in technical writing, (2) a proposed master of science degree in communication systems, (3) technical writing programs at Northeastern University, (4) a technical communication program at Rochester Institute of Technology, (5) a master of science program in technical and science communication at Drexel University, (6) a model for a technical writing minor, (7) writing processes in a technical writing program, (8) teaching writing processes in introductory and in advanced undergraduate technical writing courses, (9) teaching writing processes in technical writing at the graduate level, (10) a guided design approach to teaching technical writing, (11) resources for teaching business and professional speaking for students in technical communication, (12) possible applications of cognitive science and problem solving in technical writing, (13) new directions for graduate study in scientific and technical communication programs, (14) a lesson from literary theory on how not to theorize about technical discourse, (15) future directions for research on the professional work station and information management, and (16) new directions for study in technical communication. Minutes from the Council's annual business meeting, the conference program, and a list of attendees are included. (HTH)

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Proceedings 1982

CSCSI

The Council for Programs in Technical and Scientific Communication

Carnegie-Mellon University
Pittsburgh, Pennsylvania

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CS 208 740

PROCEEDINGS

1982

of

The Council for Programs in Technical and Scientific Communication

Tenth Annual Meeting

Carnegie-Mellon University

Pittsburgh, Pennsylvania

15-16 April 1982

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PREFACE

Included in Proceedings 1982 of the Council for Programs in Technical and Scientific Communication are a note from the new President, Virginia Alm Book, in which she reminds members of the raison d'être of the Council; the program for the Tenth Annual Meeting of the Council in the Board Room at Carnegie-Mellon University in Pittsburgh, Pennsylvania, on 15-16 April 1982; seventeen papers from the program; a record of the annual business meeting with a list of the twenty-four participants from fourteen states, the Secretary's minutes for 1982, and the Treasurer's report for 1981-82; and, as appendices, the amended Constitution of the Council, a chart that literally puts the Council on the map, and a list of the seventy-eight members of the Council.

Probably not included in these proceedings, regrettably, are the qualities that make a meeting of the Council so special: the informality and the warmth of a small meeting during which each participant meets personally every other participant. In the record of the business meeting, the Immediate Past President, David L. Carson, advises members to maintain these special qualities of the Council.

On behalf of the Council, I thank the members of the outgoing Executive Committee--David L. Carson, Virginia Alm Book, Beekman W. Cottrell, Carolyn R. Miller, and Myron L. White--for serving the Council for two years. Also on behalf of the Council, I thank Beekman and Carnegie-Mellon University for hosting our Tenth Annual Meeting. To thank David,

Virginia, Beekman, Carolyn, Mike, and CMU as best I can, I dedicate these proceedings to them.

Personally, I thank my associate editors--Roger E. Masse, Barbara Y. Myers, and Louise M. Vest--for assisting me in editing these proceedings. For Roger, Barbara, and Louise, as always, dedication is its own reward.

Patrick M. Kelley

Patrick M. Kelley
Vice President and Editor

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A NOTE FROM THE PRESIDENT

First of all, I appreciate the opportunity you have given me to serve as President of the Council for the next two years. With your help I believe we are in an excellent position to strengthen our contributions to the technical communication profession.

Among our members are several of the earliest designers of undergraduate and graduate degree programs, as well as initiators of options, minors and concentrations within existing curricula. Some of the programs have been in operation long enough now to be evaluated and restructured to better meet the needs of students as they prepare for careers in technical communication. We can all benefit from the accomplishments of these leaders in our field. Among us we represent years of valuable experience and expertise we can share with those who are just developing programs. That is, after all, the Council's purpose: to help each other, and to help those who seek our assistance by exchanging ideas and information about program development and quality criteria.

It is important that we keep in mind the reasons for which the Council was organized, that we not stray too far afield and duplicate information that is available through other organizations. We should concentrate on the problems inherent in establishing and maintaining quality programs, such as: how to develop program justifications for administrative/institutional acceptance, ways to gain curriculum approval, the advantages of seeking interdisciplinary collaboration

and cooperation, the advisability of establishing internships, how they are working where they have been established, the advantages of consulting with and seeking guidance from professionals, the benefits and limitations of establishing professional advisory boards, and so on. While presentations on how to teach a particular course, or why to teach technical courses at all, are important and worthwhile, they are not the direct concern of the Council, as stated in its Constitution. These kinds of presentations are more appropriately offered, and covered quite thoroughly at NCTE, CCCC, and MLA conferences, to name a few. The Council is a unique organization with a specific purpose, and I urge you to keep that in mind. If we lose sight of our raison d'etre, or if we diffuse and obscure our purpose, we will no longer serve a special function, and cannot justify our existence.

I encourage you, during this next year, to gather information about your programs, examine their content, their strengths and weaknesses, how they have been and are being initiated, maintained and improved, and to take note of problems as they have arisen. Let us develop our presentations for the 1983 meeting around the theme "The Second Decade: Review and Evaluation of Programs in Technical and Scientific Communication."

I look forward to seeing you in Lincoln in 1983, when the University of Nebraska will host our annual meeting.

Virginia Alm Book

Virginia Alm Book
President

PROGRAM

Tenth Annual Meeting
of
The Council for Programs in Technical and Scientific Communication

Carnegie-Mellon University
Pittsburgh, Pennsylvania

15-16 April 1982

Thursday, 15 April

8:30	Pick-up at the University Inn and transportation to the Board Room in Warner Hall for coffee and doughnuts
9:15	Welcome by Richard Young, Head of the Department of English, Carnegie-Mellon University
9:30	New Programs and Curricula: "Books, Books, Everywhere...," Carol Lipson, Syracuse University
10:10	"A Certificate Program in Technical/Professional Communication," Carol Niederlander, St. Louis Community College
10:30	Break
10:50	"Proposed Master of Science Degree in Communication Systems," Judith Kaufman, Eastern Washington University
11:20	"Alive and Growing: Technical Writing Programs at Northeastern University in Boston," Helen M. Loeb, Northeastern University
11:45	Lunch, Skibo Activities Center, Room 100
1:15	"A Technical Communication Program at RIT," Andrea Corcoran Walter, Rochester Institute of Technology
1:45	"A Master of Science Program in Technical and Science Communication," Stephen C. Brennan, Drexel University
2:15	Break

2:45 "Model for a Minor Program in Technical Writing," Joseph C. Mancuso, North Texas State University

3:15 Open Discussion on New Programs and Curricula

4:00 Pick-up at Warner Hall for return to the University Inn

6:30 Social Hour at Beek Cottrell's home, 5426 Howe Street, Shadyside

8:15 Dinner, Park Schenley Restaurant

Friday, 16 April

8:30 Pick-up at the University Inn and transportation to the Board Room in Warner Hall for coffee and doughnuts

9:15 Things Pedagogical:
"The Teaching of Writing Processes in a Technical Writing Program,"
Patrick Kelley, Louise Vest, Jane Allen, and Roger Masse, New Mexico State University

10:00 Break

10:20 Annual Business Meeting

11:45 Lunch, Skibo Activities Center, Room 100

1:00 "The Guided Design Approach to the Teaching of Technical Communication,"
Barbara A. Smith, Alderson-Broaddus College

1:30 "Resources for Teaching Business and Professional Speaking for Students of Technical Communication,"
Sam C. Geonetta, University of Wisconsin-Rolla

2:00 Break

2:15 "Possible Applications of Cognitive Science and Problem Solving to Technical Writing,"
Marilyn Schauer Samuels, Case Western Reserve University

2:45 "New Directions for Graduate Study in Scientific and Technical Communication,"
Mary B. Coney, University of Washington; Ben and Marthalee Barton, University of Michigan; Bill Coggin, Bowling Green State University

3:30 Closing Discussion and Adjournment

4:00 Return to University Inn

PAPERS

BOOKS, BOOKS, EVERYWHERE, AND NARY A DROP TO BE FOUND

CAROL LIPSON
ASSISTANT PROFESSOR
ENGLISH DEPARTMENT, SYRACUSE UNIVERSITY

As the leader of a program in technical writing, speaking to leaders of other technical writing programs, one finds oneself faced with an embarrassment of riches in considering the range of topics in our field that must be addressed. I've decided today to focus on a particularly pressing situation -- the book needs in our field. We seem to be blessed with a flood of new technical writing books coming out lately, and I know that some sitting here are working on texts, though I'm not familiar with their specific focuses. But our textbook library has definite gaps, and these get more and more frustrating to me and my coworkers as time goes on. And we do have to consider that the ranks in our field are being expanded almost exponentially by newcomers who have very little if any preparation in the writing they are teaching. They can't be expected to fill in the gaps our texts leave; they don't have the background to do so. We simply need new and better and different texts.

Before I discuss the types of texts we need, let me bring you up to date on the discussion I had with you here last year, and on what's happening in our program at Syracuse University. Primarily two things are happening. (1) Our graduate course was offered in the fall (1981) with success. I'm giving it again this fall (1982). This course had a four-fold focus: history, theory, pedagogy, and practice. Obviously the amount of practice had to be limited in a course with such a broad purview, and in the fall I am going to propose a follow-up course: an advanced workshop offering the opportunity for a substantial amount of practice. I would also like in this workshop to teach our graduate students to design and conduct empirical tests of writing.

(2) The second development in our program is that we have introduced special sections of technical writing for foreign students. In our engineering school now, 20% of the student body is foreign, and that percentage is going up. The trend is a national one, not just peculiar to us. Berkeley's technical programs are already about 50% foreign, and UCLA is now 15.6% foreign overall, with larger concentrations in technical subjects. New York State is just behind California in numbers of foreign students. As enrollments of American students decline, all of our universities are going to be boosting enrollments by admitting more foreign students, and these will congregate in tech-

nical subjects. Many technical programs require their students to take technical writing. I don't know how many of you have faced this student body already, but it's certainly something we have to plan for in future.

At Syracuse University, we at first tried keeping these students in regular technical writing sections, if they had the prerequisites such as an advanced English as a Second Language (ESL) composition course. That didn't work though. They still had many problems in grammar, and needed very much individual attention. We had to find a way to relieve faculty of that enormous burden. And the students had severe difficulties with the level of discussion appropriate for native students on style, logic, cohesion, and other elements of fine structure. With the cultural heritage they were bringing to bear on prose handling, they simply had quite different needs for the level and focus of discussion than did the native students, and our faculty began to feel schizophrenic. We managed to fund separate sections for them, and both students and faculty are pleased with the arrangement. These sections cover fewer types of writing than do conventional technical writing sections, but they can pick up on the needs of the foreign students without slowing things down for the native students.

I would recommend having such sections taught by faculty expert in tech writing; the students will resent having

someone teach technical writing who is only two steps ahead of them in familiarity with the professional writing in their fields. But assistance is needed from ESL experts. Team teaching can work. We happened to be fortunate enough to find someone with the double expertise, but I recognize that would be rare.

Now to get to my main theme -- book needs. Not surprisingly, books are scarce for the English graduate student market I've been dealing with. For these students, I created my own texts for discussion by mimeographing materials. The process was time consuming for me and expensive for the department, and not entirely satisfactory since even articles to mimeograph are scarce in a number of scholarly areas, such as history and theory. Pedagogical and practical materials abound in our field, but often the level of discussion does not suit the sophisticated graduate student audience. I feel strongly that future teachers and scholars in the field need a background in the history and theory of our field, and books should be available to help them acquire it. Though this is not a very large market, it is an important and influential one and should be addressed.

Books are needed also for the foreign student audience, and that's going to be a substantial market. Again, our staff seems to be managing quite well, by using Houp and Pearsall along with getting into the mimeographing business in a big way. We converted standard ESL-type exercises to technical subjects and created new ones to focus on issues

we wanted to deal with in technical style and structure. We've had to create lots of models and exercises with simple language patterns suitable for this type of audience. It's doable, but enormously time consuming; having suitable books would be a boon for teachers dealing with this group.

One of the largest gaps in the technical writing library is for adult working audiences. Extension courses are proliferating, in-house courses are increasingly requested, but the books suitable for such audiences are few and far between. Ewing's Writing for Results works quite well for management groups, but it's not suitable for scientists or engineers despite the inclusion of these groups in its subtitle. Many of us adapt parts of Mathes and Stevenson's Designing Technical Reports for such audiences, but we as faculty are sufficiently burdened without having to enter the mimeographing business. Many are overworked already with heavy grading, program leadership and program administration responsibilities, and TA supervising and TA training responsibilities. Others teaching these courses don't have the background to create the materials; they depend on texts or on colleagues to provide the materials for them. It is time a suitable book was produced.

Specifically, the adult audiences we teach desperately want to have a book that talks appropriately to them as adults, not one that talks to undergraduates about how important writing will be to them when they grow up and

that attempts to explain to them the types of writing they will do when they attain the state of adulthood. Our adult students know this. And they don't need to learn formats; they see these in their companies. They do need to learn design heuristics: general structuring principles for planning appropriately for particular purposes and audiences. They need discussion of general-to-particular movement on the large scale and on the paragraph level as well. They need a book to focus their attention on language use and effects of language use. Coverage of the standard trio (clarity, brevity, and simplicity) -- what Richard Lanham calls the CBS school of writing -- is just not enough. Some pretty awful writing can be absolutely clear, brief, and simple. Adult students need to be made sensitive to factors affecting the flow and sound of the prose and to impressions raised by the prose, for example to the personae created for the reader and writer. These adult students have rarely thought of their writing as actually being read, as being sounded out even silently.

Some of these same considerations apply to the books we need for undergraduates. Here too we have gaps in the types of audiences provided for. My admittedly scattered questionings at the 4Cs showed me that many of us are teaching highly heterogeneous audiences, with English majors and political scientists and communications students

and design students and scientists and engineers all mingling in one course. In my school, the faculty in the different colleges represented value the heterogeneity of our report-writing course; they consider it one of the humanizing benefits of the course. Only one school has had to resort to a homogeneous grouping for scheduling reasons, and they deeply regret it. But while our classes serve mixed audiences, the texts mainly speak to engineers or chemists. Political scientists feel as if they don't belong with the texts available; but they do belong in the courses. Pearsall and Cunningham approached this diverse audience in How to Write for the World of Work, but they speak to a lower-level community-college type of audience. For upper division professional students, we still need a book for a broad audience. I would hope to convince one of you to write one, or at least all of you to second my voice to publishers in indicating the desirability.

And even for the standard engineer-scientist audience, we need new books. We need a book that is process oriented, one that does not just tack a chapter on the writing process onto a standard format-type text. We need alternatives to the format texts. Since the earliest texts have appeared in our field, such as the one by Baker by RPI in 1923, students have been prescriptively taught the sections applicable in a 'this'report or a 'that' report, and then they graduate to find themselves having to write

something in the real world that is neither a 'this' nor a 'that', but without the preparation for designing a suitable approach. They usually squeeze their 'not this-not that' material into the headings for a 'this' or a 'that' in despair, and create monsters thereby.

Our textbooks still operate this way. Our students read chapters on progress reports and feasibility reports and format reports and find that they're perhaps in the real world only asked to do the progress report and then it's on a form. They don't have to do the other kinds of reports at work, but they do have to do lots of reports there were never any chapters on. I think it's time for more design heuristics for undergraduates so they can learn to design for whatever writing needs they have. Our textbooks are going about the task of preparing them to write in the wrong way. Mathes and Stevenson and Brunner and Souther and White are to be applauded, but their books are limited either in the audiences they're suitable for or in the coverage they supply. More such books are needed to correct the deficiencies.

The last class of book that I want to mention today as needed falls into the category of reader. There are a few readers available, but these mostly include journal articles or chapters of books. Most of our students are not ever going to be writing journal articles, nor will they write books. They will write reports and proposals, but samples of

these communication types are not provided for them. The techniques and strategies appropriate to journalism scarcely apply to them. Not only do the students need to see well written examples for suitable and varied reporting situations, but I'd say the faculty need this as much. The growing technical writing ranks are being filled by converts from literature, many of whom have never seen a real-life report or reporting situation. They need to have a set of worthy and interesting examples, beyond the student-type examples done in text books, to aid them in their teaching. Admittedly, Prentice Hall recently came out with a collection of business reports. Some of these are of interest to our field, but they leave gaps; they simply don't represent many technical writing types or situations.

If any here were just looking for a project to tackle, I hope I've provided some ideas. In any case, I do hope you will second my cry to publishers that such books are needed. Our field will reap the benefits.

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PROPOSED MASTER OF SCIENCE DEGREE IN COMMUNICATION SYSTEMS

JUDITH KAUFMAN
DIRECTOR OF TECHNICAL WRITING
EASTERN WASHINGTON UNIVERSITY

Eastern Washington University proposes to institute a new interdisciplinary Master of Science Degree in Communication Systems. The proposed degree will be a joint effort of nine departments from throughout the University: Applied Psychology, Communication Studies, Decision Science, Education, English/Journalism, Industrial Education and Technology, Management, Mathematics and Computer Science, and Radio/Television.

The cooperating departments have designed a required core of foundation courses to give all students in the program basic instruction in several key aspects of communication:

- communication theory;
- written, oral, and visual communication modes;
- delivery systems (computers, design graphics, electronic media);
- managerial and consulting skills.

After completing this required core of 22 quarter credits, each student will, in consultation with a program director, select approximately 30 credits of specialized work from an approved list of advanced courses in at least two of the cooperating disciplines. The final component of the program will be a research project or internship of 5-10 credits.

We anticipate that students will enter the program with both a bachelors degree and work experience in some area of communication. Although students may select some of their advanced courses from the field of their undergraduate specialization, we expect most students to tailor their interdisciplinary programs primarily to gain expertise in additional areas of communication. For example, a student with a bachelors degree in English and work experience as a technical writer/editor might choose to specialize in oral communication and graphics. Conversely, a student with a bachelors degree in oral communication might select technical writing as one of his/her areas of concentration.

Surveys of employers within the Spokane region suggest a potentially good market for persons trained in multiple communication specialties. Graduates of this program should be able to find employment in fields such as advertising, mass media, internal and external corporate communications, consulting, and communications management.

ALIVE AND GROWING: TECHNICAL WRITING PROGRAMS AT NORTHEASTERN UNIVERSITY IN BOSTON

HELEN M. LOEB
ASSISTANT PROFESSOR
DEPARTMENT OF ENGLISH
NORTHEASTERN UNIVERSITY

In September 1981, Northeastern University's English department began offering both undergraduate and graduate technical writing courses. In the same month, the College of Arts and Sciences initiated a Technical Writing Internship Training Program. Northeastern is expanding its technical writing programs in the face of an economy that must discourage even the most stalwart technical writing candidates. Northeastern continues its commitment to technical writing for three reasons. First, we believe we have sound programs that are valuable to our students and to the liberal arts curriculum. Second, we are beginning to integrate computers into writing courses and program administration. Finally, we are striving to establish a good relationship with area high technology firms.

The English department's undergraduate technical writing program is expanding to four courses in technical writing and a minor in technical communication. Our basic courses are an introduction to technical writing and an intermediate course in which students write lengthy term projects. Students in these courses range from third quarter freshmen to graduating seniors. Half are English majors and half are engineers. The engineers, predictably, want to improve their writing and communication skills as part of their professional education. The English majors are exploring the possibility of technical writing as a career. It is initially surprising

and a bit perplexing that the English majors frequently have neither a technical background nor acknowledged interests in technical subjects. Their search for technical topics leads them through whales, sea anemonies, hazardous waste, acid rain, cable TV, amniocentesis, and the physiological effects of jogging. In spite of the time lost in this quest for topics, the students make good progress in the first quarter. Their dilemmas are not repeated during the second quarter.

A third course, "Writing for the Computer Industry," will be offered for the first time in the fall. This course requires some programming experience, and will focus on writing computer operating instructions, computer concepts, and some programming documentation. We will urge students to do their work on university word processors. The course reflects the predominance of the computer industry in Boston's Route 128 area, and our students' interests in getting technical writing jobs with these firms.

The three technical writing courses mentioned above form the basis for a minor in technical communications, which is geared primarily to students who are considering careers as technical communicators. The minor requires a minimum of seven courses, including three technical or professional writing courses, a course in graphics, one or two courses in business and professional speaking, one course in computer science, and an additional course or courses in either computer science or other sciences. We expect the minor to attract English, journalism, and speech communications majors, as well as students from a variety of science majors.

The fourth undergraduate course is required for third quarter freshmen in Lincoln College, the school of engineering technology. This spring, we have enrolled just under 300 students whose only previous writing experience has been freshman or remedial composition. We are using Ron S.

Blicq's new text, Technically--Write! His approach is related to the case study approach in which students are given facts on which to make judgments and a setting in which to write technical correspondence and a variety of reports. We will also devote time to writing instructions. Many of our instructors have been delighted by Dean G. Hall's suggestions in "Technical Writing Class: Day One" (in Courses, Components, and Exercises in Technical Communication, Dwight W. Stevenson, ed, NCTE, 1981), and plan to start their students on paper airplanes. Most, I believe, will move on to in-class exercises building with tinker toys, bristle blocks, or erector sets. I have developed a series of classes in which small groups of students work with erector sets and write, test, and revise instructions.

To accommodate the 280 to 300 students, a total of eight professors and instructors were assigned to 15 sections of approximately 20 students. Of the eight faculty, I am the only one with experience teaching technical writing. Not wanting to throw untrained teachers at third quarter freshmen (and waiting to see who would emerge as lions and who as beset Christians), the department scheduled eight hours of workshops for the instructors. These workshops, which I conducted, covered technical style, jargon, graphics, organization, instructions, the technical review cycle, and most important, the respect due to engineers willing to write. I also urged instructors to take a genuine interest in their students' topics.

We are administering pretests and post-tests to measure writing skills. We hope to use computers to record results and allow us to do some data analysis. Because this course will continue to be required for Lincoln College freshmen, we should be able to evaluate the effects of the course over several years.

There are two graduate level technical writing programs. The depart-

ment's two graduate technical writing courses have been populated mostly by chemists and engineers. Although the courses can count toward an English M.A. in Linguistics and Writing, few English graduate students have taken them. We expect enrollments to increase in 1982-83.

The Technical Writing Internship Training Program is also a graduate level program. This is a nine-month, certificate program, whose classes meet in the evening. During each quarter, the students take one course in computer science and one in technical writing. Current students have learned BASIC, PASCAL, and how to use DEC's text editor. They have written a variety of short assignments, and a lengthy set of operator's instructions, including running the EDT software. As we originally projected the program, the students were to take classes for six months, and then begin six-month paid internships as technical writers while continuing course work at night. We have changed these plans.

The twenty applicants who began this program in September held bachelors, masters, and doctoral degrees in a variety of fields including English, philosophy, and education. Everyone enrolling in this program was in the process of retraining for a new career. Because of the paid internship, the program attracted people who were discouraged in their careers or in a career search. Many of them relied and continue to rely heavily on our work as placement agencies and career counselors. Approximately one-third of them have found full-time jobs as technical writers. Others are still seeking jobs. Interestingly, the two Ph.Ds, both former college teachers, found full-time jobs before the end of the second quarter.

The economy's effect on industry has undermined our attempt to include paid internships. Companies originally interested in and supportive

of the program have experienced hiring freezes, cutbacks, and other restraints. Some have no job requisitions; others have no space. Consequently, we have eliminated the internships and three months of course work from the program. The session that will begin next fall will continue to be a retraining effort, but one which we hope will draw fewer discouraged job seekers and more people who reasonably believe they can get technical writing jobs on their own with sufficient training.

Computers and Writing Courses

Computers are integral to several of our technical writing courses. Many of the Internship students had never used computers before, and were apprehensive about doing so. Nonetheless, we required them to learn programming and to use computers to complete their assignments. I have taken a similar approach with undergraduates in the intermediate course. We spent the first month of the quarter in a terminal room where they learned to use the text editor and wrote instructions for it. They tested each other's instructions and revised their own work. A few of the students also used the computer in preparing work for their term projects. Two students composed a survey on the word processor. They sent the survey to 35 area firms that hire technical writers, and based their term reports on responses to the survey.

The English department plans to integrate computers into other technical writing courses, including "Writing for the Computer Industry." Further, the department is working towards using computer assisted instruction in remedial writing courses, and toward creating a data base on our writing students. (Northeastern conducts remedial classes for approximately 500 freshmen per year, and freshman composition for 2,500 students.)

Technical Writing and the Co-operative Plan, Liberal Arts and Industry

Northeastern's English department has made a substantial commitment to teaching technical writing. Our primary motivation is to provide practical course work for students who seek jobs as technical writers, and for engineering students who recognize technical writing as an important professional skill. We are encouraged that the technical writing courses have direct, tangible results for our students. Although Northeastern's co-operative plan seldom recruited jobs for technical writers, students from our courses are beginning to apply for and get the few available technical writing co-op jobs. Our students' success in the last six months speaks for the viability of these co-op positions. And, for many English majors, technical writing co-op jobs may be the only co-op experiences that lead to a profession. English majors are typically placed as clerk/typists, teachers' aides, and shelf cleaners in the university bookstore. We hope to establish a trend to place English majors with training in technical writing and sciences in co-op positions in industry.

Our commitment to technical writing programs also reflects our belief that technical writing enhances the liberal arts education. Liberal arts curricula have traditionally combined physical and social sciences, mathematics, humanities and the arts. Technology is taking its place there. Technical writing courses provide one setting in which students can and must integrate technology and communication.

The most successful technical writing classes produce English majors who have broken down some of their resistance to technology and science, have examined their topics with an analytical eye, and have learned to communicate about these subjects. At the other end of the spectrum, engineers are compelled by the classroom situation to communicate with

students and teachers who are not engineers. This experience provides a rare environment in which they must break away from jargon and measurements to let at least some of the world in on what they are thinking. They take on the challenge with enthusiasm, and become stimulating communicators.

Finally, Northeastern's English department and College of Arts and Sciences recognize their potential relationship with area high technology firms. The lead in establishing close relationships between high technology and academia has been taken by engineering colleges; we are following closely in this pattern. We are incorporating computer technology as often as possible in our courses to make our writing programs relevant to industry in the Boston area. We are also seeking to involve industry and professional colleges in our programs as advisors and potential employers.

Area industries have endorsed a "two percent solution" in which they plan to divert two percent of their research and development budget to Massachusetts higher education. They have offered this plan to alleviate some of the strain that will be caused by reduced federal funding and to help offset the movement of bright students and faculty away from academia and into industry. The contributions will go to colleges that offer degrees in engineering and computer science. The Boston Globe reported that the recent joint meeting of the American Electronics Association and the Massachusetts High Technology Council "did not address specific ways for companies and academia to work together, but it got several people thinking about the problem."

Northeastern also has been "thinking about the problem." Although technical writers are not as sought after as electrical engineers and com-

puter scientists, they are important to their companies. We are beginning to make area industry aware of our students, our efforts to train technical communicators, and our emphasis on computer technology. We hope that before long, high technology industry will begin to "work together" with us.

A TECHNICAL COMMUNICATION PROGRAM at ROCHESTER INSTITUTE OF TECHNOLOGY

Andrea Corcoran Walter
Director, Humanistic Studies
Rochester Institute of Technology

During the 1981-82 academic year, preliminary planning was undertaken to develop a Technical Communication program at Rochester Institute of Technology. Two aspects of that planning deserve consideration by those considering the establishment of such a program -- the process by which planning has proceeded based upon the institution's relationship to the Rochester industrial community, and the identity of RIT, its resources and its constraints.

Rochester Institute of Technology has long exercised a form of curriculum development based upon its relationship to Rochester. In 1829 citizens of the new town established the Rochester Atheneum. The purpose of this group was to serve:

> as a forum for the exchange of the commercial and political news of the day, and for the discussion of problems connected with wholesome living. (Hoke, 1937, 24)

In 1885 the Mechanics Institute was founded. This technicum grew during the wave of German and Irish immigration:

> to promote such practical education as may enable those persons receiving instruction to become better fitted for their occupations in life. (Hoke, 1937, 51)

In 1891 the two institutions merged to form the Rochester Atheneum and Mechanics Institute which in 1950 was renamed Rochester Institute of

Technology. Both predecessors had origins in the needs of the community.

This continues to be the case with today's program development. Still committed to career education, RIT's newest effort, The School for Applied Industrial Studies, established in 1978, emerged from the demand of local industries for precision craftsmen in machine tool, electro-mechanical, and drafting trades. Local industrial leaders participate in need assessment, in the identification of technical components of the curriculum and in the acquisition of financial resources to support program development and implementation.

It is, then, the practice of all colleges of Rochester Institute of Technology, particularly the College of Continuing Education, to seek input from prospective employers in program development. After receiving much useful input from CPTSC at the 1981 meeting in Seattle, and after conversations with RIT representatives and consultants, the College of Continuing Education is proceeding to establish two advisory groups to assist in program design. The first group will consist of industrial leaders and managers. From them we look for philosophical direction and policy advisement. The second group will consist of technical communicators and supervisors. Here we seek advice on operations, curriculum, and placement opportunities. The advisory groups will include representatives from the Institute, from STC, and from local industry. Members are being chosen from the two Rochester giants, from medium, and from small companies. They are being selected from manufacturing as well as from new software industries. These advisory groups will be asked for specific input on:

current trends from which to make decisions on program options and priorities.

access to employers for placement and intern opportunities for students.

The first task of the advisory groups will be to undertake a survey of employers of technical communicators. A pilot sample is currently being interviewed; after that a larger sample will be sought through a survey instrument. That survey seeks information on:

organizational placement of technical communicators
numbers of technical communicators employed
numbers hired each year
credentials sought
years of experience sought
kinds of communicative skills sought
communicative tasks expected in positions
desirability of an experiential component

Following that data gathering, set for early fall, 1982, priorities will be set, a program designed, and the formal curriculum review process undertaken.

Based upon expectations of the outcome of our investigation, Rochester Institute of Technology provides a wealth of resources contributing to the skills required of a technical communicator. RIT has ten colleges, several of which specialize in communicative arts: The College of Fine and Applied Arts in communications design; the College of Graphic Arts and Photography in printing and photography; the College of Applied Science and Technology in computer science. In addition, the National Technical Institute for the Deaf offers extensive resources in communication disciplines and communication disorders. The College of Continuing Education, whose function is to provide these resources to the adult student, operates as a composite of the Institute as a whole, drawing on the faculty and facilities in

order to serve an adult, part-time population. The interdisciplinary nature of technical communication makes the institutional structure and the college position an ideal context for the development of this program.

Technical communication, as opposed to technical writing which was considered and rejected about ten years ago, represents the interdisciplinary combination of many of the Institute's major strengths. Research indicates that a technical communicator must exhibit the *sine qua non:* an ability to write well-organized, grammatically correct, yet clear and precise prose. He must often present that information in formal or group oral presentations. The College of Continuing Education's communication program has been a strong service area in the college because of our adult students' recognition of the need for the communication skills in business and industry. Most programs of study require several speech and writing courses. In addition, students elect them when they have the opportunity.

The technical communicator must be able to write about scientific and technical subject matter, must understand his audience, must deal with computer-generated statistics and design, and must work with graphics specialists. RIT's program can be adapted to the person who functions in a small company and performs all operations in the production of technical documents or to the individual working for a large corporation who needs only to be aware of the processes of document production.

Because the College of Continuing Education at RIT presents a microcosm of the total Institute, it is logistically convenient to draw on institutional resources within this controllable environment. Many

full-time day programs originated in CCE.

The current priority is to offer a bachelor's degree. There has been interest expressed in a Masters level program. However, our technical programming course structure and instructional staff support the baccalaureate level, with the Institute offering an M.B.A. for those who wish to continue. Our primary audience would be students who have earned a two year degree at RIT or at a technical college. Assuming that students begin with a technical background, the program would emphasize a theoretical grounding in rhetoric, then specific training in format and technical style. In addition, students would study design, layout, graphics, statistics, cognitive psychology and speech communication. They would be required to demonstrate computer literacy (a requirement of all RIT graduates).

Existing Courses	New Courses
History of Language	Rhetoric
Organizational Communication	Cognitive Psychology
Photography	Intercultural Communication
Printing: Design and Layout	Writing and Editing
Production Management	Writing for Publication
Estimating	Art and Technology
Copy Preparation	
Typography	
Development of Printing Types	
Paper and Printing	
Computer Applications in Printing	
Basic Design	
Basic Drawing and Media	
Color Theory	
Lettering and Layout	
Introduction to Computers and Programming	
Data Processing Principles	
Effective Speaking	
Discussion Skills and Leadership	

Figure 1.

An inventory of courses which might contribute to this program, Figure 1 presents courses (both existing and new offerings) which might be applied to the program.

It is our hope that such a program would graduate "TECHNICAL WRITERS" -- the most desirable variation of technical writer identified by Richard Meyers, in the first quarter, 1982, Technical Communication.

Interest has also been expressed by liberal arts graduates from local community colleges for a degree which would provide a career option beyond the Associate in Arts degree. We hope to design an alternative in the program which will include either courses in more generalized professional writing or a minor in technical studies.

The process of data gathering through industrial advisory groups, matching institutional resources, and program design will take another year. We expect to incorporate the program into 1984 catalogue which goes to press in the fall of 1983. Next year will be spent in curriculum design, proposal writing, and presentation.

It is our hope that this advance research and planning will result in a Bachelor of Science degree in Technical Communication which will represent the resources of Rochester Institute of Technology and will make a worthy contribution to the country's technical communication programs.

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A MASTER OF SCIENCE PROGRAM IN TECHNICAL AND SCIENCE COMMUNICATION

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DREXEL UNIVERSITY

Philosophy of the Program

Drexel University, a largely technical institution in West Philadelphia, believes in combining formal classroom instruction and practical work experience. The average Drexel undergraduate therefore spends eighteen months of his five college years working in jobs related to his major field. Drexel's Department of Humanities-Communications has applied this philosophy to its Master of Science program in Technical and Science Communication, which completed its first year this past spring. Besides taking courses in writing and other areas of communication, students in the program work as professional communicators. This training and experience will, we believe, make our students highly employable. But as the Department of Humanities-Communications, we want our students to be more than employable; we want them to understand how technical and science communication relates to human values and how it affects society and other disciplines. Thus our curriculum includes several courses that give a humanistic perspective on the profession.

The Curriculum

Students must earn 45 credits from their coursework--30 credits from our core curriculum and 15 from electives offered by our department

or other depa-tments in the university. The courses in the core curriculum are as follows:

Writing

Technical Writing

Science Writing

Technical and Science Editing

Audio-Visual

One of:

Technical and Science Photography

Technical and Science Graphics

And one of:

Technology and Technical and Science Communication

Technical and Science Film

Communication Theory and Methods

Theories of Communication and Persuasion

Message Design and Evaluation

Humanistic Perspectives on the Profession

Science and Technology, Literature and the Arts

Ethics in Technical and Science Communication

The Practice of Technical and Science Communication

Most of these core courses are taught by members of the Department of Humanities-Communications. Our regular faculty offers experience in technical writing and editing, communication research, science filmmaking, computer science, telecommunications, and interdisciplinary

studies in science, technology, and the humanities. When we cannot provide a trained professional from our regular faculty, we bring in qualified adjunct faculty. Last winter, for example, Donald Drake, science writer for the Philadelphia Inquirer, taught our Science Writing course.

The writing courses--the heart of the program--emphasize practice over theory. In the Technical Writing and Technical and Science Editing courses, both of which I have taught, students undertake major projects which they present in various stages for class critique. The projects, almost without exception, are not mere academic exercises but reports or articles actually to be submitted to a company or journal. In the editing course, for example, several students were already working in industry as editors and brought to class documents they were editing on the job. Another student, a medical researcher, edited a colleague's proposal for new equipment. For the other students, I supplied articles given to me by Drexel faculty and a professional engineering journal. Not all of these projects will finally be published, but all of the students will have encountered the problems an editor faces every day.

Students must take two of the core curriculum's four audio-visual courses, which help them understand the possibilities of media other than the written word. Three of the courses teach basic skills--photography, graphics, filmmaking. The fourth, Technology and Technical and Science Communication, is a lecture and discussion course that explores how new technology alters the way information is processed, stored, distributed, and displayed. Guest lectures and field trips broaden the students' experience and introduce them to new technologies like video discs, optical fibers, computer graphics, and holography.

The course concludes with discussions of the social, ethical, and legal questions these developments raise.

The five courses in writing, editing, and audio-visual communication give students practical skills and a broad knowledge of the field. But equally important in the curriculum are the courses that aim specifically to deepen the students' understanding of the nature of communication. Thus students must take Theories of Communication and Persuasion, Message Design and Evaluation, and three seminars relating science and technology to humanistic concerns.

The first of these seminars--Interconnections: Science and Technology, Literature and the Arts--explores how advances in science and technology have shaped the arts and changed our perceptions of ourselves and our world. The course also examines the creative impulses and methods that technologists, scientists, and artists share and suggests how understanding literature, the arts, and aesthetic theory can improve technical and science communication.

The second seminar--Ethics in Technical and Science Communication--grounds the students in ethical theory and gives them practice in making the kinds of ethical decisions they will face on the job. Students study the ethical theories of such philosophers as Plato, Hobbes, Mill, Kant, and Dewey and discuss such contemporary writings as J. Bronowski's Science and Human Values. They also present case histories of ethical dilemmas in scientific practice and in communicating technical and scientific information.

The third seminar--The Practice of Technical and Science Communication--has not yet been offered, but it will introduce students to the special responsibilities, problems, and opportunities they will have as professionals.

The Future of the Program

Thus far both faculty and students are pleased with the program. We are, however, considering a number of ways to improve or expand it. We are seeking more money so we can offer more fellowships and assistantships than the few we offer now. We are trying to attract more students so we can offer more advanced electives. We are trying to develop a greater sense of community through a graduate student association, a newsletter, and more frequent program-wide meetings, lectures, workshops, and social events. We are also considering a summer institute that would make Drexel a center for improving the teaching and practice of technical and science communication in the Delaware Valley. Whether or not we accomplish all of these goals, the ultimate success of our program will be measured by the success of our graduates. However, all indications are that we are producing educated, skilled communicators who will find satisfying careers in their chosen field.

MODEL FOR A MINOR PROGRAM IN TECHNICAL WRITING

JOSEPH C. MANCUSO
COORDINATOR OF TECHNICAL WRITING
NORTH TEXAS STATE UNIVERSITY

I was hired in the summer of 1981 by the Department of English at North Texas State University to oversee the teaching of eight sections of English 270, Report Writing, a basic sophomore course offered to students in all departments of the university.

I accepted the position with the idea of building a program in technical writing for students who would spend their professional lives working in industry or government. Because of my own experience as a technical writer, it was clear to me that many staff persons in industry and government were insufficiently prepared to write clear, persuasive technical reports. My own view was collaborated by many conversations I had with personnel managers, technical writers themselves, and other staff connected with companies in the Dallas/Ft. Worth Metroplex.

In the fall of 1982, I began developing a program in technical writing for North Texas State University. I drew on my own experience; my knowledge of programs at Texas A & M and Oklahoma State Universities; comments from fellow members of the Society for Technical Communication (Dallas

Chapter), and from colleagues at NTSU. The result was a minor program in technical writing to be offered through the Department of English. (Refer to Appendix A of this paper for "A Statement for the Department of English Section of the North Texas State University Bulletin." See also Appendix B of this paper for the full proposal titled "Filling a Need in the Dallas/Ft. Worth Metroplex: A Proposal for a Minor Program in Technical Writing at North Texas State University.")

It was especially important for me to consider the politics of passing a technical writing minor through the Department of English at NTSU, a humanities faculty with a strong, traditional orientation. I consulted often and at length with my colleagues in the department and spent the spring academic semester lobbying for this minor program. I also tested the waters with faculty members in other departments within the division of Arts and Sciences to determine the minor program's chances for success in the Arts and Sciences Curriculum Committee.

The result of the talking and trading was a uniform approval of the minor program in technical writing. During the spring semester 1982, the minor program passed both the Advanced Courses Committee and the Curriculum Committee of the Department of English. At the final faculty meeting of the Department of English on April 29, 1982, the proposal was discussed under "minor business" and passed. The program will be considered again, finally, under "major

business" at the first faculty meeting to be held August 24, 1982. The prognosis for passing the program through the Department of English is very good.

The proposal will next be considered by the Arts and Sciences Curriculum Committee during the fall semester. I feel especially confident of its passage within that group, for it already has the support of a majority of departments represented on that committee. The final hurdles are passage through the University Curriculum Committee and then the entire Faculty Senate. It is unusual for these final two committees to countermand the wishes of departmental and divisional committees.

The minor in technical writing should be in place by the spring of 1983.

Appendix A

Statement for "Department of English" section of Bulletin

The Minor in Technical Writing

A program designed for students who wish to develop writing skills for use in business, industry, and government. Research papers, proposals, progress reports, process and operating manuals, journal articles, abstracts, newsletters, memoranda and other technical reports form the basis for writing and editing assignments.

Required Courses--Minors must complete the following 21 hours of course work: English 131-132, 240, 270, 316, 416, 492A or 492B.

Recommended Courses--Depending on the area of technical writing in which students will employ their skills, basic courses and readings in the sciences are recommended.

Since business and industry relies increasingly on computer programming, Computer Sciences 101 and/or 110 are especially recommended.

Minors should consult with the Director of the Technical Writing Program to determine the most advantageous selections in keeping with individual professional goals.

Appendix B

FILLING A NEED IN THE DALLAS/FT. WORTH METROPLEX: A PROPOSAL FOR A MINOR PROGRAM IN TECHNICAL WRITING AT NORTH TEXAS STATE UNIVERSITY

Submitted by

Dr. Joseph C. Mancuso

Coordinator of Technical Writing

North Texas State University

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Abstract

If this proposal is approved by committees in the Department of English, the Division of Arts and Sciences, and the University, North Texas State University (NTSU) will offer Metroplex students and employees a program in technical writing, the first of its kind in this area. Southern Methodist University, University of Texas (Dallas), University of Texas (Arlington), and Texas Christian University--the other major institutions in the Metroplex--offer one technical writing course each.

NTSU will offer students five courses in technical writing and award a certificate of achievement upon completion of the minor program.

Courses in the NTSU program are Report Writing, Technical Editing, Advanced Technical Writing, Technical and Scientific Literature, Advanced Grammar and Style in Technical Writing.

Possibilities for recruiting students to the Department of English via the minor in technical writing are discussed, as are methods of promoting the minor program.

Finally, employment opportunities in the Metroplex are considered for students who complete the minor.

Acknowledgements

I am grateful for the comments that my colleagues in the Department of English have made, informally and in writing. Thanks to Edra Bogle, Jake Kobler, Chuck Martin, and Bob Stevens for their efforts.

Special thanks to Chairman of the Department, David Kesterson, and Chairman of the Advanced Courses Committee, James Tanner, for the benefit of their considerable experience.

Filling An Existing Need

Proposals, progress reports, research reports, process manuals, feasibility studies, and other technical reports have formed and will continue to form the foundation of written communication in business, industry, and government.

In recent decades the tempo of the production of these technical reports has increased, along with the technology used to reproduce and store these reports.

Recently, however, business and industry has expressed a disenchantment with the quality of its written communications. Poorly worded reports take too long for staff to read, resulting in wastes of time, effort, and money; these same reports maim and kill when operators of dangerous machinery are misled by confusing instructions.

The Dallas/Ft. Worth Metroplex is fast becoming a hub of business and industry which depends on technical reports to document the research and development of new products, describe the operation of complicated machinery, and communicate the benefits of products and services.

So far, no other college or university in the Metroplex has offered a program in technical writing.* Therefore, a rare opportunity exists for North Texas State University to place itself in the vanguard of educational activity in the field of technical communication.

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*Institutions canvassed are Southern Methodist University, University of Texas (Arlington), University of Texas (Dallas), and Texas Christian University. These institutions regularly offer one basic course in technical writing.

Business and industry are now actively searching for staff who write clear, concise and persuasive technical reports.

If the Department of English, the Division of Arts and Sciences, and the University approve a minor in technical writing, they will be fulfilling a two-fold need: assisting business and industry in accomplishing its work, and equipping students with employable skills.

Role of the Department of English

North Texas State University needs a program in technical writing for undergraduate, graduate and special students.

The purpose of any program in technical writing is to train students from all disciplines to write clear and persuasive technical reports used in business, industry, and government. Because of its pre-eminence in the teaching of writing, the Department of English at NTSU should furnish the leadership in providing these technical communication courses. Toward this end, the Department can offer a minor in technical writing, a program of study in which the student may acquire specialized communication skills.

In developing such a program, the Department should proceed conservatively and offer a nucleus of traditional technical writing courses, adding new courses only after thorough consideration.

It is important to establish the program now. We must be careful that other departments do not develop technical writing courses to service their own needs. The Department of English should establish its ground as soon as possible.

Why a Minor Rather Than A Concentration or a Specialization?

All three possibilities were contemplated.

At first, the specialization in technical writing seemed best until I considered the requirement that all students at the University must have both a major and minor. Fulfilling both of these requirements leaves the student relatively few courses to choose outside of the major and minor--and the student usually elects a cross-section of courses to round out his education after finishing his major and minor work. Hence, a specialization in technical writing, amounting to four or five additional courses, would tax the student looking to broaden an overall program.

Next, I considered a concentration in technical writing for English majors. This may well be our program of the future. It may be offered to majors at the B.A., M.A., and Ph.D. levels. But, again, that is the future. We must "test the waters" first in a more limited way to see whether or not sufficient numbers of students will be drawn to the advanced courses in technical writing. Right now the prognosis is good, witness the twenty students who registered for English 316 (Technical Editing) the first time it was offered.

The minor in technical writing is an ideal way for the Department to begin its quest to recruit more students and to fulfill a need expressed by Metroplex firms. Every student at North Texas State University must choose a minor. That fact in itself creates a market for us.

Moreover, many major fields of study would be complemented by a minor program in technical writing. If a student will need to write technical reports in his vocational/professional life, he will need to understand the formats and strategies of those reports and to practice writing them under the tutelage of a skilled instructor. A student can be best trained to do this in technical writing courses in the Department of English.

A minor program demands that a student elect at least six hours of advanced work in that discipline. In the fall of 1982, the Department of English will offer two advanced courses in technical writing totaling six hours--English 316 (Specialized Expository Writing: Technical Editing) and 416 (Advanced Expository Writing: Advanced Technical Writing)--and will, therefore, provide some courses for students to take in fulfillment of a minor.

In addition, many of the students minoring in technical writing will have taken English 270 in partial fulfillment of the sophomore English requirement.* In my judgment,

*English 270 will be required as part of the minor. However, 270 may be waived for students who are too far along in their degree programs and who demonstrate considerable writing ability.

English 270, 316, 416 and one other technical writing course will be necessary to round out the minor in technical writing. That one other course will be English 492A (Special Seminar in Literature: Technical and Scientific Literature) or English 492B (Special Seminar in Language: Advanced Grammar and Style in Technical Writing).

Cost of Implementing the Minor in Technical Writing

The cost of implementing a minor in technical writing will be negligible.

Existing faculty can teach all courses in the minor. There will be a need to hire new faculty only if sections of the technical writing courses proliferate beyond present expectations.

I shall assist all faculty interested in teaching sections of the technical writing courses by holding orientation sessions at the end of the spring semester and the beginning of the fall semester, 1982. I will be available through this summer, too, for anyone who might wish to meet.

We should advertise our new minor if we decide to approve it by having fliers and brochures printed. Certainly, the numbers of new students drawn to the Department can offset that expenditure.

Certificate of Completion

Each student completing the minor in technical writing may receive a Certificate in Technical Writing attesting to his achievement. A student may include his Certificate with other resume materials when seeking employment. Conversations with Metroplex employers have convinced me that the Certificate will significantly distinguish the candidate and his unique skills.

Curriculum for the Minor in Technical Writing

The NTSU Bulletin: General Catalogue, 1981-1982 under "Requirements of this Catalogue," #5 (pp. 16-17) stipulates that one of the requirements for graduation is

> A first minor of at least 18 semester hours, including at least 6 hours of advanced work (except for the B.A.A.S. degree and certain composite majors and integrated fields). [emphasis mine]

The Department of English is dedicated to offering students the strongest possible preparation for their vocations and will, therefore, require that students minoring in technical writing take twenty-one hours of English including at least three advanced courses (English 316, 416, and 492A or 492B).

Three (or more) advanced courses in technical writing will be enough to satisfy employers scrutinizing the academic

training of job candidates for positions demanding elevated communication skills. I believe after many conversations with the employers in the Metroplex that the more technical communication courses a student can take, the more attractive a job candidate he will be and the better prepared he will be to write and edit the te ical reports of business, government, and industry. The following courses, along with certain recommendations outside of the Department of English, constitute an ideal minor program in technical writing.

English 131 Grammar and Composition (3 semester hours)

Practice in written composition; sentence structure, paragraph development, composition organization; reading model essays; individual conference.

English 132 Composition and Rhetoric (3 semester hours)

Continuation of English 131, rhetorical devices and effects. Preparation of fully documented research paper, assigned library readings; individual conferences.

English 240 Masterworks of Literature (3 semester hours, to be taken in conjunction with English 270)

A one-semester survey of literary masterpieces from classical works through modern literature, requiring a minimum of 4,000 words of writing.

English 270 Report Writing (3 semester hours)

Expository writing, especially for science, pre-engineering, business students.

English 316 Specialized Expository Writing: Technical Editing (3 semester hours)

Shaping the raw reports of business and industry into final form by developing the following skills:

-plan reports with technical writer
-represent the audience as first reader
-judge the impact of reports
-correct the technical content, flaws in logic, and organizational problems
-coordinate the text with graphics
-check accuracy of footnotes and bibliography
-proofread for grammatical errors

Students will develop familiarity with range of technical reports and prepare a personal style manual.

English 416 Advanced Expository Writing: Advanced Technical Writing (3 semester hours)

A workshop in preparing proposals, progress reports, technical articles, brochures, newsletters, abstracts and other reports related to business and industry.

and either

English 492A Special Seminar in Literature: Technical and Scientific Literature (3 semester hours)

Historical survey of scientific and technical literature from non-fiction and fiction writers. Survey of recent materials garnered from business, industry, government. Emphasis on development of the style of technical and scientific literature.

or

English 492B Special Seminar in Language: Advanced Grammar and Style in Technical Writing (3 semester hours)

Students will complete course with thorough knowledge of nuances of traditional rules of grammar and usage, punctuation and capitalization as they relate to technical writing. Students will study advanced grammar handbook and style manuals to build on basic knowledge.

Note: I suggest that we offer either 492A or B in the spring semester, 1982. Thereafter, we might alternate them every year, or if the minor is popular enough, we can offer one each semester. Some students may decide to take both.

492A and 492B, 316, and 416 are "experimental" courses. If they "make" regularly, we would attempt to give them permanent status, then place them in a more logical sequence and consider making some prerequisite to others.

In order to round out the minor in technical writing, it is recommended that the student consider taking the following courses:

1. One or two beginning courses in Computer Sciences, e.g. Computer Sciences 101, 110.
2. A one semester cooperative education placement in technical writing.

Recruitment of Students

The Department of Computer Sciences and the College of Business Administration concur in the assessment that at least three advanced courses be required for the minor in technical writing, and their input is important, given the numbers of students from their areas who take and will continue to take our technical writing courses.

For the Bachelor of Science in Computer Sciences the following requirement is stipulated on p. 79 of the Bulletin:

> Attainment of at least the level of course 102 in a foreign language (by course completion or by examination); or 8 semester hours sophomore level or above, selected from the departments of English, Speech Communication, and Journalism (Journalism courses must have prior approval of the Computer

Sciences Department). Courses taken in satisfaction of the University requirements may not also be applied to fulfill requirements in this area. [emphasis is mine]

Because of Computer Sciences' eight-hour requirement in Communications on top of the twelve hour University requirement in English, many of the approximately one thousand Computer Sciences majors possess at the end of their careers what amounts to a minor in English, or close to a minor. Members of the Computer Sciences faculty seem eager to recommend three advanced courses in technical writing to their students in fulfillment of a minor in technical writing.

Also, the College of Business has recently required that English 240 and 270 be taken by students majoring in business. This development augurs well for recruitment possibilities for the minor program as does a statement by Dean Hays of the College of Business that his students can benefit from the minor in technical writing as outlined in this proposal.

The Department of English must actively recruit students to the minor in technical writing. We cannot depend on any other department to do our work for us. The Department of Computer Sciences is a case in point. It guaranteed us 30 to 35 students for our Technical Editing course offered this spring. Three computer sciences students showed for that course--along with 12 English

majors (there are 20 students in the course). I do not see the situation as the fault of the Computer Sciences faculty members. They needed more information about our offerings, and those offerings should have been promoted vigorously.

The point is that once our technical writing program is established, we should sit down with the Computer Sciences faculty and explain the individual courses carefully, so that when Computer Sciences faculty advise students about desirable communications courses, they (the faculty) can respond in detail.

Better yet, the Department of English should present the details of the minor in technical writing to a convocation of Computer Sciences students. Dr. Tom Irby of Computer Sciences has asked that I do that during their departmental meeting on April 19. Five hundred to six hundred Computer Sciences students usually attend this meeting.

In addition, Business, Physics, Biological Sciences and other faculty should be contacted as soon as possible about any technical writing program the Department of English approves.

Moreover, it would be important for us to address convocations of students in various departments to explain, first hand, the minor in technical writing.

A minor in technical writing has high career potential when coupled with any major. Our own English majors are accepting the reality of using their communications skills

in business, industry, and government settings. Twelve majors have joined my Technical Editing class in hopes of finding positions in technical writing.

With a minor in technical writing, NTSU can counter the question, "What can you do with training in English?" with "You can start by making $20,000 a year; use your writing skills every day; bring a literary background into play in your work and enjoy professional advancement because of communication skills." And we have English majors and majors from other departments now in technical writing positions in the Metroplex to prove this.

The $20,000 salary figure is not an arbitrary one. It is based on many conversations with technical writers and those who hire technical writers. The consensus among these persons takes the following into account:

1. The more technical writing courses one takes in an academic setting, the higher will be the salary.
2. Having taken Computer Sciences courses is a strong plus in salary considerations--so too are courses in the pure sciences.
3. A cooperative education placement also "ups the ante."

I canvassed fifty technical writers/personnel managers describing a "typical graduate" with a minor in technical writing (four courses), one-two courses in computer sciences, a cooperative education placement in technical writing. The range was $17,000-$23,000 with a mean of $20,000.

Further, when students presently minoring in other areas take courses in our technical writing program, they may switch to the minor in technical writing. This can happen once other minors see the potential for those with technical writing skills.

A minor in technical writing also lends itself to the cooperative education concept. Cooperative education can be a great recruiting tool for the Department of English, in that, cooperative education is a screening device used by firms to find full time employees. Students are aware of this.

What Department of English Faculty Can Do Outside the Classroom for Students Minoring in Technical Writing

1. Help to place students in cooperative education situations. Although cooperative education placements should be greatly encouraged, academic credit for these placements may not be given at this time.

2. Encourage firms in the Metroplex and nationwide to visit NTSU for on-campus interviews with English majors "concentrating" in technical writing.

3. Wherever appropriate, cite the advantages of the minor in technical writing.

4. Promote a knowledge of technical writing opportunities. This can be done by compiling a list of firms which express a desire to hire graduates with elevated skills in

technical communication. The Director of the Technical Writing Program and/or the Undergraduate Advisory Office can accomplish this task via computerized lists. Keeping in touch with alumni of the Technical Writing Program will also help.

Promoting the Technical Writing Program

If a minor in technical writing is approved by the Department of English, a brochure and other informative materials should be disseminated within NTSU, other educational institutions, and firms in the Metroplex.

A brochure or flier could be printed for students which answers the question, "What can I do with training in English?" In the copy we might indicate the following:

a. Find exciting work in business, industry and government
b. Continue working with language and literature
c. Use writing skills extensively
d. Realize substantial salary and advancement
e. Work in a creative environment

The brochure copy might contain testimonies from English majors now working as technical writers, from corporation executives and personnel staff on the need for communication skills, and from department chairpersons indicating the need for communication skills in their particular disciplines.

Also, the Department of English can distribute packets of information to departmental advisors giving details of the minor.

Whenever possible, the Director of the Technical Writing Program and other members of the Department may address groups in academe, business, industry, and government concerning the minor.

With a program in place at NTSU, and not just a course or two, Metroplex firms may be receptive to an approach in which they are cast as partners: NTSU educates students whom they may someday employ as technical writers or as personnel with upgraded writing skills. In addition, NTSU may educate personnel presently on their staffs. The Department of English at NTSU will function even more effectively if firms can supply the Department with necessary technology. This approach has worked in the past in other settings and may now work for us.

Failing that approach, the University might finance a technical writing/editing classroom with word processors sometime down the line. The University is well aware of the potential of electronic instructional media and is studying the feasibility of incorporating this technology in new areas.

Another possibility might include sharing existing word processing hardware and software with the Departments of Computer Sciences and Journalism, especially when Computer Sciences expands its facilities.

COORDINATING THE TEACHING OF WRITING PROCESSES IN A TECHNICAL WRITING PROGRAM

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Almost everyone who teaches writing is talking about writing processes. But in our Technical Writing Programs, we teach writing processes instead of just talking about them.

Teaching Writing Processes

Two writing processes are the bases for our teaching. The first is a process that is described by Michael E. Adelstein in his text on business writing in a section that is headed "Writing Is Work,"[1] and the second is a process that is described by W. Morris Dean in an article that is titled "Invoking the Muse of Technical Writing."[2] These two writing processes are the bases for our teaching because they are toward opposite ends of the range of writing processes. (See Figure 1.) Positioned as they are on this range, the two writing processes provide contrasts that are extraordinarily useful to teachers, to students, and to writers.

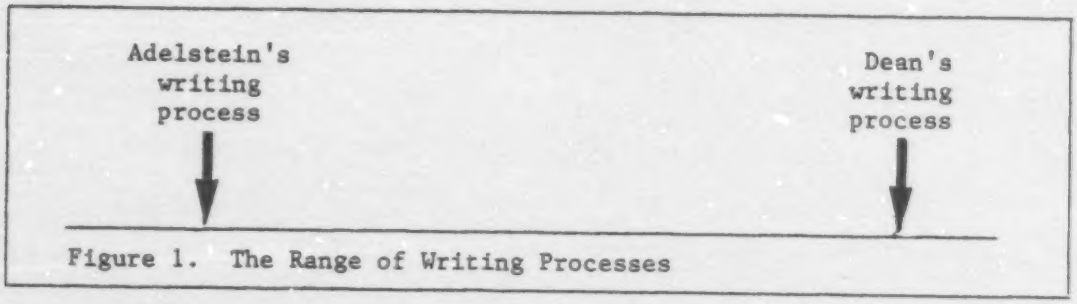

Figure 1. The Range of Writing Processes

Adelstein's Writing Process

Adelstein's writing process, according to one of my students, is "a left-brain process." Adelstein divides the writing process into five steps and allots a percentage of the total time for a writing project to each step:

1. Worrying (15 percent)
2. Planning (10 percent)
3. Writing (25 percent)
4. Revising (45 percent)
5. Proofreading (5 percent)

The process is remarkably linear with each step separate from every other step and with the fifth step the end of the process.

For an illustration of Adelstein's writing process at work, assume a writer and a writing project--a short, simple letter--in which time is more important than quality because the letter was, like all letters, due yesterday. Able to devote only 30 minutes to the writing project, the writer worries during the first 4½ minutes of the half hour. He plans in the next 3 minutes. He drafts next, writing non-stop without revising, for 7½ minutes. He revises the draft into a final copy in the next 13½ minutes. And he proofreads the final copy during the last 1½ minutes. At the end of the 30 minutes, the writer is finished with the writing project, writing the letter with this linear process.

True, the product that the writer produces with this linear process is, as we say in the business, quick and dirty. But the process works in writing projects in which time is more important than quality. And the process works for most writers. It works even for a writer who is sure that it will not work for him, who is sure that his process is

recursive, and who is sure that he cannot write without recursion upon recursion upon recursion--upon recursion. In my experience as a teacher, as a student, and as a writer, Adelstein's writing process is not only remarkably linear, but also remarkably productive.

Dean's Writing Process

Dean's writing process compares in that it, too, is remarkably productive. But Dean's process for invoking the muse of technical writing contrasts in that it is "a right-brain process." Dean divides the writing process into three steps:

1. Preparing (giving information to the muse)
2. Incubating (letting the muse work with the information while the writer performs other work--or plays or sleeps)
3. Experiencing Insight (receiving information from the muse in the form of a draft)

The process is recursive. Dean, in fact, describes it as spiral with the draft from the third step returning the writer to the first step, again and again and again, for successive rounds of preparing, incubating, and experiencing insight.

For a contrasting illustration of Dean's writing process at work, assume a different writer and a different writing project--a long, complicated report--in which quality is more important than time. Able to devote 30 days to the writing project, the writer prepares during the first day by giving information to her muse. She incubates during the next several days, working on other projects--and playing and sleeping--while her muse works on this project. Then, one day, she experiences insight by receiving information from her muse in the form of a draft. Writing and rewriting and rewriting the report while

spiraling through this process again and again and again, the writer is not finished with the writing project until time ends for it on the 30th day.

The product that the writer produces with this recursive process is, if you will forgive me, slow and clean. The process works in writing projects in which quality is more important than time. And the process works for most writers. It works even for a writer who is sure that she does not have a muse--until her muse convinces her otherwise through her productivity. In my experience as a teacher, as a student, and as a writer, Dean's process is at least as productive as Adelstein's process, if not more productive.

The Range of Writing Processes

My student who described Adelstein's writing process as "a left-brain process" because of its emphasis on writing as conscious work and Dean's writing process as "a right-brain process" because of its emphasis on writing as the work of the subconscious decided, after experience with the two processes, that the two processes together have the potential for a finite number of combinations and that each process individually has the potential for an infinite number of variations. He decided, moreover, that he has the potential to choose from among these combinations and variations--from among this range of writing processes--a process that will be efficient for him as a writer to produce the product that is required of him in a writing project. His decisions were more delightful than apples for his teacher.

Coordinating the Teaching

All nine to twelve of us who teach technical writing in the

Technical Writing Programs teach Adelstein and Dean's writing processes. We teach the processes at three different levels: at the introductory undergraduate level in English 218, Technical and Professional Communication; at the advanced undergraduate level in English 318, Advanced Technical and Professional Communication; and at the graduate level in English 577, Workshop in Technical and Professional Communication. And some of our students take only one of our courses, others take two of our courses, and still others take all three of our courses. Because so many of us teach the same writing processes, because we teach these same writing processes at three different levels, and because our students take as few as one and as many as three of our courses, coordination of our teaching is necessary. Necessary as it is, this coordination is nevertheless simple. It is simply a matter of different emphases.

Teaching Writing Processes at the Introductory Undergraduate Level

At the introductory undergraduate level in English 218, Technical and Professional Communication, we emphasize practice with the writing processes. Sophomores read Adelstein and Dean's descriptions of writing processes and apply this theory[3] by practicing the processes. Our purposes at this level are to teach students the concept of writing processes and to teach students to increase the efficiency of their writing processes through practice.[4]

Teaching Writing Processes at the Advanced Undergraduate Level

At the advanced undergraduate level in English 318, Advanced Technical and Professional Communication, we emphasize practice with the writing processes and research into writing processes. Juniors and seniors read or re-read Adelstein and Dean's descriptions of

writing processes and apply or re-apply this theory by practicing the processes. Additionally, through limited secondary research and simple primary research, they study the writing processes of other students or of professional in their fields. Our purposes at this level are to teach students the concept of writing processes, to teach students to increase the efficiency of their writing processes through practice, and to teach students to become efficiency experts on their own writing processes through the study of others' processes.[5]

Teaching Writing Processes at the Graduate Level

At the graduate level in English 577, Workshop in Technical and Professional Communication, we emphasize practice with the writing processes, research into writing processes, and theory on writing processes. Graduate students read or re-read Adelstein and Dean's descriptions of writing processes and apply or re-apply this theory by practicing the processes. Through extensive secondary research and sophisticated primary research, they study the writing processes of professionals in technical fields or of professional technical writers. Beyond this, they develop their own theory on writing processes. Our purposes at this level are to teach students the concept of writing processes, to teach students to increase the efficiency of their writing processes through practice, to teach students to become efficiency experts on their own writing processes through the study of others' processes, and to teach students to consider writing processes theoretically on the bases of their practice and research.[6]

Conclusion

For both teachers and students, writing processes are Cleopatran:

"Age cannot wither [writing processes], nor custom stale / [their] infinite variety." As teachers, we never tire of teaching writing processes; and our students never tire of learning about them. Adelstein and Dean's descriptions of writing processes, like literature, offer us something new with each re-reading. They offer us, for instance, a new sense of the right side of the brain at work in Adelstein's process and of the left side at work in Dean's process. For teachers, each group of students is always new in their response to the concept of writing processes. For students, each level is always new with a new emphasis--practice, research, theory--and even the old concept of writing processes is new for students at higher levels because, by virtue of their learning at lower levels and of their increasing maturity as writers, they always understand the old concept anew.

Notes

[1] Contemporary Business Writing (New York: Random House, 1971), pp. 11-16.

[2] Technical Communication, 20, No. 4 (1973), 9-11.

[3] In this context, I use theory in an essential sense of the term: a theory is an attempt to describe reality. The reality here is the writing process.

[4] For a detailed discussion, see Louise M. Vest and Patrick M. Kelley's "Teaching Writing Processes in Technical Writing at the Introductory Undergraduate Level" in these proceedings.

[5] For a detailed discussion, see O. Jane Allen's "Teaching Writing Processes in Technical Writing at the Advanced Undergraduate Level" in these proceedings.

[6] For a detailed discussion, see Roger E. Masse's "Teaching Writing Processes in Technical Writing at the Graduate Level" in these proceedings.

TEACHING WRITING PROCESSES IN TECHNICAL WRITING AT THE INTRODUCTORY UNDERGRADUATE LEVEL

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Imagine, if you will, twenty-four college sophomores sitting very still--most with their eyes closed--listening to music from a tape and to the quiet voice of their professor as he guides them through an awareness exercise into their imaginations. Because this instructor has established a warm, accepting atmosphere with his students, he needs only his voice to maintain contact with them as they pursue their various imaginative wanderings. Finally, the room is completely quiet except for the music playing softly in the background. The instructor melts into the group and enjoys the music with his class. This scene remains for perhaps fifteen minutes. The instructor then calls his students back to the classroom for a "tea party." They spend the next ten minutes or so drinking tea, listening to music, talking and laughing with one another and with their instructor while their subconscious minds wrestle with an already assigned writing task. Following the "tea party" and as they are individually ready, each picks up a pen or pencil and begins to write. You might think: "Aha, a creative writing class." Perhaps.

Again, imagine, if you will, these same twenty-four students writing almost non-stop as their instructor moves among them with a

stop watch, threatening mildly to slap any hand that revises when it should be writing during the allotted time. He "talks" them through the exercise with suggestions, reminds them of the time as they progress through the various steps, praises those who follow directions, and admonishes those who resist or fail to comply with the instructions. Does this scene seem to contradict your initial impressions of this instructor and the apparent purposes of this class? The instructor certainly seems different from the relaxed, personable instructor in the first description. Yet, this is the same instructor and the same group of students. They are all involved in a course--English 218, Technical and Professional Communication--in which they are experimenting with writing process strategies in technical writing.

The addition of a process unit to technical writing was essential when we found that our students could not respond to our question, "How do you write?" To help them answer that question, we set about introducing several process strategies to enable them to identify what it is that they do to produce a final draft.

THE PROCESS UNIT

Traditionally, the focus in teaching technical writing has been directed to the final product. Despite attempts to help students with style and structure, usually through the use of "canned" exercises, almost no attention has been given to the question, "How do you write?" Until writers know how they translate ideas into written words, they are ill-equipped to judge the quality of this work or to feel confidence in their written products. Because different writers respond to different influences, we chose a continuum of strategies to help students discover for themselves their individual writing processes.

The Organizational Strategies

Ultimately, our product is technical or professional in nature, and technical communication must inform--clearly and concisely. So even as we challenge students to explore how they write, we incorporate strategies designed to help them organize their thinking processes to facilitate the logical expression of this writing. The two strategies introduced and practiced in partnership with the process strategies are visual rhetoric[1] and the log. If one thinks of our process unit as existing on a line or continuum--a line stretching, ostensibly, into infinity--then the organizational strategies are the means of transportation employed to move along this continuum.

Visual Rhetoric. Providing graphic aids to invention and revision through presentation of simple, clear diagrams, visual rhetoric adds a component to the process unit that we have found to be especially helpful for technical writing students who tend to be visually rather than verbally oriented. The added dimension of seeing a paragraph gives many students a new security with their ideas as they invent. Mary S. Hageman, in the concluding paragraph of her paper on invention in visual rhetoric, states: ". . .it is vitally important that technical writing students internalize most common paragraph structures so that the choice, the inventive moment, becomes automatic and intuitive. The visual rhetoric diagrams enable the student to see these structures and thus learn them quickly and efficiently."[2] For revising, visual rhetoric--offering a design for a simple paragraph of detail ( ), several designs for simple paragraphs of illustration ( ), and several designs for complex paragraphs of analysis ( )--gives writers a visual connection with their ideas that a traditional

outline fails to do. Not only are the ideas on paper in some order, but the picture of the paragraph is available as well. One of the primary advantages to the diagrams is the immediate recognition of what is missing or out of order. Visualizing a paragraph that they are about to write, or one already written, provides students with the ability to make decisions concerning the presentation of their material.

The Log. We introduce a second organizational strategy, the log, in which we ask students to record several different kinds of entries. For instance, we ask them to write their impressions, ideas, interpretations, and responses as they read and practice. We also ask them to keep rough drafts of assignments in the log as well as notes they make as they are planning projects. We use the term log instead of journal because we direct the form that the log takes instead of using it in the ways that journals are often used in composition classes. This strategy encourages the procedure followed throughout the course: read, respond, practice, respond.

The Process Strategies

We introduce two process strategies, "Adelsteining" and "Musing."

"Adelsteining." We introduce Michael E. Adelstein's "Writing Is Work"[3] as the first process strategy on our continuum because of its easy-to-follow, almost rigid structure. Adelstein suggests that students "should be aware that writing, like many other forms of work, is a process." His procedure involves five steps that are broken down into percentages for the time allotted to a given task: Worrying--15%; Planning--10%; Writing--25%; Revising--45%; and Proofreading--5%.

During the worrying step, students are asked to think about their topic and to allow ideas to come and go, to start to formulate thoughts,

to connect these thoughts with other ideas. Mostly, this step gives students an opportunity to settle into the topic without the pressure of trying to express their ideas in sentences--or even words--immediately.

The planning step is mostly a non-writing step as well. Students are asked to take their ideas from the worrying step and begin to organize them--again before they translate this material into sentences. These first two steps help writers to focus their thoughts and ideas and encourage ample time for pre-writing. Since one generally "adelsteins" tasks that are relatively short and that demand very clear organization, the visual rhetoric paragraph of detail fits well with this strategy. The structure of any of the visual rhetoric diagrams allows no more than words or phrases and so encourages the flow of ideas that otherwise might be impeded if the writer were to attempt to write while in the planning step.

Needless to say, once the students reach the writing step, they are more than ready to seize their pencils or pens and begin to capture their thoughts on paper. During this step, the instructor watches carefully to see that they write--not revise or look up correct spelling for words or rewrite sentences. The point is to get as much material as possible written during a given time period.

Adelstein has given the revising step the greatest percentage of time, and students are challenged to revise--not simply to proofread. Here the instructor praises heavily revised papers and holds them up for everyone's admiration. We are not interested in pretty papers or clean copies at this point. Indeed, some of the most highly praised papers in the revision step are nearly impossible for anyone other than the writers to read, but they know that they will have the opportunity to rewrite later.

The final step, proofreading, occurs after the writers write or type a final draft in order to catch misspellings, typos, comma errors, etc. Although we do not wish to de-emphasize perfection in the final draft, we do fight the good fight to keep this step separate from the revising step.

Although some of our students object to the time factor and to our insistence that they follow the process without deviation--initially, at least--they finally see the point to the exercise. The minute they object to Adelstein's method, they have to know what it is that they do differently. Insight! The next step, then, is to evaluate that difference and to decide which is more efficient and effective for them. On the other hand, equally as many students like Adelstein's steps and find his pattern for writing helpful, even comfortable.

"Musing." Since Adelstein's method can be seen as very structured, we were delighted to find Morris Dean's "Invoking the Muse of Technical Writing"[4] for the other side of our continuum. His technique involves steps not dissimilar to Adelstein's procedure in terms of progression to a final draft. What is different is the means by which the writer progresses to the draft. Encouraging a relaxed, stress-free environment, Dean employs humor and common sense in his approach to contacting the "muse" or to using the subconscious to work for writers as they attend to other facets of life (anything from brushing teeth to sleeping to sipping tea and listening to Mozart on tape). Dean identifies the steps in his process as preparation, incubation, and insight. Cyclical in form, this process can be repeated as often as is necessary for the writing task at hand or for as long as time to complete the task allows.

In a classroom exercise with the muse, preparation includes thinking through the assigned topic, making notes of ideas, even talking about the topic with other students. Because we are primarily interested in our students experiencing success with the process, we assign accessible topics--ones that they will be able to organize quickly and write about easily. After allowing sufficient time for preparation, we help our students contact their muses.

Because atmosphere is so important in the exercise with the muse and because a classroom is a rather inflexible setting, we have added a little to Dean's original procedure with an exercise to help our students relocate temporarily in the more magical land of the imagination by asking them to get comfortable, to close their eyes if they wish, to listen to the music in the background. We ask them to imagine that they are alone in a place of peace and tranquillity and that they experience this place as fully as possible through their five senses. We quietly ask such questions as:

Where are you?	At the edge of the sea at sunrise? . . . High in the mountains in the snow? . . . On the desert in early spring? . . .
What do you feel?	Soft spring rain? . . . Warm sunshine? . . . A gentle breeze? . . .
What do you hear?	Waves crashing against the shore? . . . Leaves crunching underfoot? . . . The silence that seems to come only with the snow? . . .

We continue in this way through all five senses before asking students just to enjoy the space while their muses work for them.

The visual rhetoric paragraph of illustration lends itself well to "musing." One student reported visualizing her muse dancing inside

the box used to depict illustration. This was a nice example of the merging of two strategies as the student engaged in the writing process.

The sensory awareness exercise is just one possibility for creating the necessary climate for contacting the muse. Another approach might include the tea and music but substitute slides for the guided awareness exercise. Some teachers may be more comfortable with showing pictures of sunsets and rainbows than they are with talking about them. Because the success of any strategy depends on the degree of comfort for the leader of that strategy, each instructor should find a means of achieving the proper atmosphere that fits his/her personality and teaching style. The one "should" involved is to remember that whatever the strategy, the group should experience it together.

Incubation is a period of time set aside from the actual writing task to give the subconscious time to work. We arrange a time of social exchange, encouraging students to move around the room and visit with one another as they drink tea and listen to music. After ten or fifteen minutes, we ask them to return to their desks to find out what their muses have given them.

To record the insight, we remind students that the muse has one requirement: a pen, a pencil, a typewriter, a computer terminal--in short, a medium for delivering the ideas from the subconscious. Encouraging students to write freely, we emphasize that revising comes later and that with this process writers can recycle as ideas change and grow.

Of all the strategies we use, the muse elicits the most surprise from our students. Can this be technical writing? Yet, once they overcome their initial discomfort, most students tell us that they

followed a similar process but were unaware of it because they thought of it as procrastination rather than creation.

Once integrated, these strategies can be used by even the most hesitant students to evaluate the differences in their own writing processes. What we are interested in, of course, is that our students--through practice--identify their own personal writing processes and, especially, the strengths and weaknesses within these processes. The process strategies--as well as the organizational strategies--are designed to give students decision-making capabilities as they write. For too long, their writing has controlled them. Even "good" writers have told us that they were never sure why their writing was considered good and that they wrote with more hope than confidence that the results would continue to be satisfactory. Our process unit gives all of our students the means to the end of controlling their own writing, instead of having their writing control them.

NOTES

[1]See Patrick M. Kelley, "Visual Rhetoric in Teaching Technical Writing"; Mary S. Hageman, "Visual Rhetoric in Technical Writing: Invention"; Adelaide (Johnnye) Burnham, "Visual Rhetoric in Technical Writing: Arrangement"; and Linda Stout Chavarria, "Visual Rhetoric in Technical Writing: Style" in Proceedings of the 27th International Technical Communication Conference (Washington, DC: Society for Technical Communication, 1980), II, R-209-27.

[2]Hageman, R-217.

[3]Contemporary Business Writing (New York: Random House, 1971), pp. 11-16.

[4]Technical Communication, 20, No. 4 (1973), 9-11.

TEACHING WRITING PROCESSES IN TECHNICAL WRITING AT THE ADVANCED UNDERGRADUATE LEVEL

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English 318, Advanced Technical and Professional Communication, is a sequel to English 218, the introductory technical communication course at New Mexico State University. Although the introductory course is not a prerequisite, about half of our advanced students have taken it and find it valuable preparation for English 318, which reinforces the emphasis on writing processes begun in 218. Further, our advanced course encourages students to study the writing process of another student or of a professional in their field. Finally, a series of editing workshops in which students focus on revising papers they have written for other courses emphasizes the importance of writing as a process.[1]

Writing Process Theory

To reinforce the concept of writing as process, we spend three class periods early in the semester reading and discussing articles on writing processes and in writing exercises that illustrate various writing processes. The first two sessions repeat some of the work on writing process that students do in English 218.[2] We ask students again to read Adelstein and then guide them through an exercise using his process. And we ask students again to read Dean and guide them

through an exercise using Dean's process. Then we ask students who were already familiar with Adelstein and Dean to compare this experience with their previous experience and discuss their reactions with the rest of the class.

For the third session, we ask our students to read Linda Flower and John Hayes's "The Cognition of Discovery: Defining a Rhetorical Problem," in which Flower and Hayes discuss the importance of the writer's goals in formulating a rhetorical problem.[3] In class we give students a writing problem and ask them to use their own writing process. After about 10 or 15 minutes, we ask them to stop--some have not started writing yet. Then we ask them to write a retrospective protocol of their writing process, to put down in writing as best they can all that they thought or did during the previous 10 or 15 minutes. After students have done this, we ask several of them to share their analyses with the class, and we discuss the writing process in terms of persona, audience, meaning, and form.

By now our students are intrigued by their own writing processes. They realize that Adelstein's process doesn't quite fit them and neither does Dean's. But they are intrigued by writing. More importantly, as some of them have revealed in their logs--which I ask them to keep throughout the semester--they no longer feel guilty because they can't immediately set pen to paper. They no longer feel guilty because they can write only under pressure. They no longer feel guilty because their approaches to writing are different from the way English teachers have told them they should be. In short, these exercises have helped our students to acquire confidence in themselves as writers. Moreover, they are curious about writing; and some of them inevitably choose to

research and write about the writing process of a fellow student or of a professional in their field.

Writing Process Assignment

At this point we assign an analytical report that deals with writing process or structure and style. Students have their choice of three assignments: they can report on the writing process of a fellow student; they can report on the writing process of a professional in their field; or they can report on the structure and style in a sample of writing by a professional in their field.

In addition to our work on the theory of writing process, we spend two classes each on structure and style, stressing particularly Patrick M. Kelley's concept of visual rhetoric and Charles Stratton's method for analyzing technical style.[4] Other class discussions include the treatment of report format, scientific method, mechanics, and graphics.

We urge students to work on these assignments in collaboration with one or two other students, explaining to them that they need experience working with others to prepare them to work as professional writers, and that they can obviously learn from one another.

Two English majors in my Fall 1981 course, Deborah Caldwell and Monica Torres, chose to research the writing process of one of their English professors and then analyze the changes in their own writing processes as a result of their research.

Caldwell and Torres related four significant discoveries. First was the need to allow more time for their own writing projects in order to have adequate time for prewriting and revision. Second, they noted that they had gained an awareness of the need to identify their audience. Third, they discovered the need to devise a plan for research

and writing that would give focus and purpose to their writing. Finally, Caldwell and Torres indicated that they had come to understand more fully the importance of revision in that through revision they "discovered (and rediscovered) what points we were truly trying to make." They also came to appreciate the "value of having another person present to edit." "Neither of us," they wrote, "had had much experience in letting peers or colleagues criticize her work." But they learned, they said, the value of another's opinion. In closing, they wrote: "In analyzing others' writing processes, we discovered our own."

Editing Workshops

We feel that an important factor in the success of our courses is our use of workshops, which inherently focus on process as opposed to product. We use workshops throughout the course as students revise their resumes and letters of application early in the semester and as they revise their analytical reports on process or structure and style.

For one unit of our course, we ask students to bring reports or other projects they are engaged in for their major fields to class for editing workshops. Each student brings in a project in draft form. We reproduce the piece of writing and give each student a copy. During the next class meeting, the entire class joins in editing and discussing the report. Students are then responsible for revising these projects and turning in a final draft for a grade.

This unit works especially well with heterogeneous groupings of students. Our nursing students, for example, become intensely aware of the importance of good topic sentences and transitions in leading the uninitiated reader through the intricacies of a report in computer science. Learning thus the importance of logical structure and

development, they are even more sensitive to it in their own writing. A remarkable feature of this unit is the improved quality of the drafts we edit as the unit progresses. Students who submit their drafts for editing later in the unit are clearly using the skills they acquire from analyzing other students' papers.

Not only does this unit give students the opportunity to look closely at the work of others, it reinforces the importance of revision as a part of the writing process. Further, it helps students develop editing techniques they can apply on the job or in revising their own work. Students overcome self-consciousness about their own writing; they learn that writing does not have to be a solitary activity, that it is a process that can and often should be shared with others.

Conclusion

Our process-oriented advanced technical and professional communication course evokes gratifying responses from our students as they discover their own writing processes, as they learn the importance of revision in the writing process, as they learn that group work and workshop participation can be a positive, rewarding experience.

Notes

[1]The New Mexico State University technical writing programs, as they presently exist, were developed by Professor Patrick M. Kelley. The introductory course in technical writing, English 218--then titled "Report Writing"--was first taught in the fall of 1970 by Professor Kelley, who developed the course into its present format. From one section of about 20 students in the fall of 1970, the course has grown to 10 sections enrolling more than 200 students per semester. Professor Kelley developed and taught the first course of English 318 to a small group of students in the spring of 1976. Since then the demand for the course has grown. In spring of 1982 we offered two sections of the course to a total of 32 students; we are planning three sections for the fall of 1982.

[2]See Michael E. Adelstein, "Writing is Work," Contemporary Business Writing (New York: Random House, 1971), and W. Morris Dean, "Invoking the Muse of Technical Writing," Technical Communication 20(4):9-11.

[3]College Composition and Communication 31:21-32.

[4]See Patrick M. Kelley, "Visual Rhetoric in Teaching Technical Writing," in Proceedings of the 27th International Technical Communication Conference 2:R 209-213, Society for Technical Communication, 1980, and Charles R. Stratton, "Analyzing Technical Style," Technical Communication 26(3):4-9.

TEACHING WRITING PROCESSES IN TECHNICAL WRITING AT THE GRADUATE LEVEL

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So many teachers talk about writing process, but so few teachers actually teach writing process. At New Mexico State University, however, teachers of technical communication concentrate on teaching writing processes on the undergraduate and graduate levels. For graduate students who take the Advanced Workshop in Technical and Professional Communication, we use the beginning classes of a semester to make all students in the course aware of writing processes and to begin technical communication graduate students on their search for a theory of writing process.

Because most of the graduate students didn't receive their undergraduate degrees from NMSU and didn't take the undergraduate technical communication courses at NMSU, they haven't been exposed to the concentration on writing processes in those courses. Thus, practice in writing processes is needed to make the graduate students aware that different writing processes exist an' that they too have writing processes. Building awareness of individual writing processes is accomplished through three practice sessions early in the semester.

Because my graduate technical communication workshop meets one

night a week for three hours, I begin with introductions of the course, myself, and the students in the first half of the first session and with the first writing process exercise in the second half of the session. In that second half, I ask the students to write one or two paragraphs to complete the following assignment:

> The title of English 577 is "Technical and Professional Communication." In one or two paragraphs, define, explain and illustrate the phrase "technical and professional communication." Your purpose in writing the paragraphs is to indicate for the professor of the course your present understanding of the phrase.

The students think that I am asking them to provide samples of their writing, that I am interested in written products, or that I am interested in what they can produce in a short time. However, after they have worked for five minutes, I ask them to stop writing. I then pass out another assignment that asks them to do a protocol analysis of their writing behavior for the past five minutes. I explain that a protocol analysis is a detailed record of behavior, that their analyses are records of what they did in the past five minutes while they worked on the definition assignment. After they have recorded their analyses, I ask them to return to their definition paragraphs and to be aware of what they are doing as they work. After ten minutes I stop the students again and ask them to describe in detail what they were doing in the last ten minutes. We repeat this process again after they have written for ten or fifteen minutes. Then I ask the students to discuss their writing behaviors. Each student explains what he or she did in the first five minutes of work on the definition and what they did later in the other blocks of time. They discover that other students followed similar behaviors,

that some had a structured approach, that some had a haphazard approach, that all had problems in writing, and that some had solutions to their problems. Most of all they become aware--for the first time for some of them--that they were involved in a process of some kind, that writing involved not only the written product but also a writing process. At the end of class I pass out copies of Michael E. Adelstein's chapter " Writing Is Work" as a reading assignment for the next class.*

In the next class period before we work with Adelstein's writing process, I discuss a topic with the students to provide content for a piece of writing that they will do. I give the students a list of definitions of technical writing from many different sources for a discussion of what technical writing is. The definitions emphasize the informative and the objective aspects of technical writing. To illustrate these aspects of technical writing, we examine a description of the narwhale by Herman Melville in Moby Dick and a contrasting description from a nonfiction text entitled The Whale.** We also look at three contrasting descriptions of eagles from John M. Lannon's Technical Writing.*** We discuss the ideas of informing an audience versus entertaining an audience and being objective versus

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*In Contemporary Business Writing. New York: Random House, 1971, pp. 6-16.

**See Patrick M. Kelley and Roger E. Masse, "A Definition of Technical Writing," The Technical Writing Teacher 4 (Spring 1977): 94-97; rpt. in Patterns of College Writing. Ed. Laurie G. Kirszner and Stephen R. Mandell. New York: St. Martin's Press, 1980, pp. 299-306.

***Boston: Little, Brown and Company, 1982, chapter 1.

being subjective. In addition I present information from J. C. Mathes' essay "Technical Communication: The Persuasive Purpose" to suggest the idea that besides informing, technical writing can be persuasive.*

Then we move to Adelstein's essay. We first clarify what is in the essay as we examine his efficient writing process of five stages with each stage including a conscious concentration and only a set amount of time on that stage of the writing process. As we objectively describe the five stages and time allotments (15% of alloted time for worrying, 10% for planning, 25% for writing, 45% for revising, and 5% for proofreading), I concentrate on getting the students to describe but not to judge the stages, to understand the stages clearly without judging them yet. After they consciously practice the stages, they can express their opinions about the process. For the present I just want them to understand that Adelstein provides an efficient operation that enables a writer to specialize in each stage of the writing process in turn.

Then we "Adelstein." I pass out the following assignment:

> For tonight's work, practice a writing process that may or may not be like your own writing process. Whether it is like your own writing process or not, consciously practice the stages of it to demonstrate your understanding of the process and ability to work with it.
>
> Consciously using Adelstein's process for writing, follow the writing stages to produce a coherent, clear, detailed piece of writing for the following assignment:

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* English in Texas 11 (Summer 1980): 81-83.

"Assume that a potential employer has asked you to write a paragraph explaining the nature, function, and essential qualities of technical writing. Write such a paragraph as you would if a possible job depended on it."*

Use this sheet to begin your work and later turn in all your written work. Concentrate on each stage of the process, especially on stage 4 on revising, for you do not have to turn in a "final draft." Concentrate on the process of writing. Each stage will be timed and you will be expected to concentrate on only one stage at a time.

I emphasize that the students need to concentrate consciously on only one stage at a time, that they will be hounded to stick to one stage at a time, that their hands will be slapped if they move to another stage before it is time to, that their purpose is to learn something about a writing process--no matter how much they may want to resist it, no matter how brilliant they may think their own writing processes are. I stress that they should be consciously aware of each stage by doing each stage deliberately. Then as they work for an hour, I badger them to consciously work one step at a time. For 9 minutes they are allowed to "worry." For 6 minutes they are allowed to plan. For 15 minutes they are allowed to write a rough draft. Then they take a break, but I caution them to get away from the assignment by not discussing what they are doing. After they have their coffee and tea break, they are allowed to revise for 27 minutes. Then for 3 minutes they are allowed to proofread the rough draft so that it is a fully revised draft that later could be typed. After their experiences with "Adelsteining," we discuss what they

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*The assignment is from Joseph A. Alvarez, The Elements of Technical Writing. New York: Harcourt Brace Jovanovich, 1980, p. 17.

have been doing. They discuss their problems with the process and their success with the process. They compare it to their own writing behaviors and become aware that they do indeed have writing processes. They usually decide that Adelstein's process is an efficient one because it forces them to specialize on each stage in turn. For their next class, though, they are asked to read about a completely different process, the process presented in W. Morris Dean's "Invoking the Muse of Technical Writing."*

At the next class I begin discussion of how I invoked a muse to help me write after I had prepared to write through researching and thinking about a topic. I usually explain how a muse helped me write a conference paper or an article for a journal. I describe how I fretted about the writing task, read and reread articles and books on my topic, took notes about the subject, examined the writings of scholars, pondered about my sources and my approach, panicked about my deadlines, reviewed my sources and notes, put off writing, took several naps, and finally sketched a rough draft as my unconscious mind seemed to help the writing flow. Then I ask the students to explain what I had gone through according to Dean's article. Without judging the process, the students use my example to explain the parts of the process: preparation or the conscious part of the mind recognizing the writing task, determining the audience and purpose, and surveying sources of information; incubation or the writer giving the task to the muse while he or she does something else or even sleeps;

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* Technical Communication 20 (Fourth Quarter 1973): 9-11.

and insight or the muse producing when the writer sits down and writes freely without getting stuck f ords or worrying about revision. After we describe Dean's musing process, I ask the students to consciously practice the process by writing a comparison and contrast of Adelstein's writing process and Dean's writing process.

They begin with "preparation" by reviewing the articles and their notes, by thinking about our discussions and their experiences with the processes, and by jotting down a few notes though they are cautioned not to make an outline or to begin a rough draft. Then with a very soothing voice, I ask the students to go into "incubation." I ask them to put their pencils down, to relax, to close their eyes, to consciously contact their muses. I ask them to suspend their disbelief in muses if they feel they don't have one and to have faith in their unconscious minds. I ask them to silently give their muses orders for the writing task they have to do, to let the muses take over while they go on a trip.

Then I take the class on a trip. Last semester I had carrot cake, coffee, and tea prepared for our break. I turned on a tape of Ravel's Pavane pour une infante defunte and other pieces for piano solo. While they talked, ate, and drank, I showed slides of sunsets and took them on a short tour of the Acropolis, Mykonos, and Delos. After 20 minutes we returned to sunsets in New Mexico and to the writing exercise as I asked the students to pick up their pencils and to let their muses produce, to get to the writing of the draft quickly, and to write out the whole comparison and contrast by let-

ting the words flow, by writing nonstop, by writing freely.

After the students had let their muses produce, we discussed the next part of the process, which is a repetition of the cycle of preparation, incubation, and insight. Then we discussed their experiences with the process. (They liked the carrot cake best.)

The work with the two processes--one structured and the other unstructured--gives the students experience with writing processes so that they are not only reading about the processes but also practicing them to understand them completely. The work with the processes raises their consciousness about writing process. They begin to understand that they have writing processes and that they can make their writing processes more efficient by being aware of what they are doing when they write. They become aware that writing process is something that can be examined. Because their experiences with the two basic processes are so different, they realize that the teacher isn't giving them a process that must be followed always, that they don't have to be tied to one exclusive process, and that different processes exist.

In addition to the work on experiencing writing processes, the graduate students who are in the technical communication program at NMSU are required to do research on writing processes. If they are taking the graduate workshop for the first time, they are asked to describe their theory of the writing process. They are given the following assignment:

In the semester that you take English 577 for the first time, study writing process in technical and professional communication to develop a knowledge of theory on writing processes and to develop your own theory on writing process.

Complete the following reading and writing assignments.

1. Read articles and books on writing processes. For your reading include materials from technical communication and materials from composition theory.

2. Then, write an essay for the technical communication professors and the graduate students in the NMSU technical communication program (or for publication) on your literature search and on your theory of the writing process in technical and professional communication. For your written essay include a literature review of the reading materials with the explanations of your own theory of writing process. Either make the literature review a separate section of your paper or integrate it into the developed explanation of your theory.

The word "theory" is used in this assignment to mean a proposed explanation, perhaps conjectural, to explain the operation of certain acts or behaviors. It is used in the sense of a looking at, a contemplating, a speculating of how something operates or how something is done.*

For their research on writing processes, I give students a bibliography for the beginning of their literature searches. The bibliography, which is presented in the Appendix, contains articles on writ-

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*Those purists who would use a stricter definition of "theory" should realize that the definitions used here are similar to the more usual definitions of the word as given in dictionaries, such as Webster's New Twentieth Century Unabridged Dictionary and Webster's Third New International Dictionary. See also Janet Emig, "Inquiry Paradigms and Writing," College Composition and Communication 33 (February 1982): 64-75.

ing processes in composition and technical communication. I also tell students to use the lists of references at the end of articles for titles of other articles and to check technical communication journals, such as Technical Communication, The Technical Writing Teacher, Journal of Technical Writing and Communication, and Proceedings of ITCC. I suggest that they have computer searches done. I suggest that they examine other people's writing processes as they examine their own writing practices.

The students then combine their research with a description of their writing processes. Last Fall semester Marie Richardson combined research with her own technical writing experiences at ASL (Atmospheric Sciences Laboratory) to explain that her theory of writing process includes four steps: (1) prewriting or formulating and beginning a project by defining a problem, determining the message and audience and purpose, gathering material, and ordering ideas; (2) writing or keeping it going; (3) rewriting or cleaning it up through revision; and (4) proofreading or giving it a final check. Another student, Mary Lou Vocale, attacked the idea that good writing comes only from a knack or an emotional experience as she explained that good writing comes from hard work as the writer's brain makes conscious effort in a writing process that includes prewriting, writing, and rewriting. Last Spring semester a third student, Martha Delamater, described a writer as a magician who must follow a process that is partly magic and partly hard work to fill the mind, to fill the page, and to reshape the page. A fourth student, Claudia Shirley, described the writing process as recursive problem-solving because

the writing often depends on how the writer defines the message and the purpose and the audience, how the writer constructs the final draft, and how the writer views and performs the revising process.

The work on the graduate level thus makes students aware of writing processes through conscious work with several processes, discussions of their experiences with different processes, examination of the research on writing processes, and development of their own concepts of writing process.

APPENDIX

SELECTED RESOURCES ON WRITING PROCESSES

PREPARED BY
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Adelstein, Michael E. "Writing Is Work." In Contemporary Business Writing. New York: Random House, 1971, pp. 6-16.

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Crowley, Sharon. "Components of the Composing Process." College Composition and Communication 28 (May 1977): 166-69.

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Elbow, Peter. Writing with Power: Techniques for Mastering the Writing Process. New York: Oxford University Press, 1981.

Emig, Janet. "Inquiry Paradigms and Writing." College Composition and Communication 33 (February 1982): 64-75.

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_____ and John R. Hayes. "A Cognitive Process Theory of Writing." College Composition and Communication 32 (December 1981): 365-87.

_____."The Cognition of Discovery: Defining a Rhetorical Problem." College Composition and Communication 31 (February 1980): 21-32.

_____."Problem-Solving Strategies and the Writing Process." College English 39 (December 1977): 449-61.

Freisinger, Randall R. "Style in the Universe of Industrial and Academic Discourse." Convention paper, Modern Language Association, December 1981.

Hall, Dennis. "The Role of Invention in Technical Writing." The Technical Writing Teacher 4 (Fall 1976): 13-24.

Hertz, Vivienne L. "The Composing Process in Technical Communications." In Technical Communications: Perspectives for the Eighties (Proceedings of the 32nd CCCC). Ed. J. C. Mathes and T. E. Pinelli. Hampton, Virginia: NASA, 1981, pp. 423-32.

Hughes, Carol. "Process-Based Pedagogy and Process-Based Research: Implications of the Composing Process in Technical Communication." In Technical Communications: Perspectives for the Eighties (Proceedings of the 32nd CCCC). Ed. J. C. Mathes and T. E. Pinelli. Hampton, Virginia: NASA, 1981, pp. 413-20.

Johnson, Sabina T. "The Ant and the Grasshopper: Some Reflections on Prewriting." College English 43 (March 1981): 232-41.

Knoblauch, C. H. "Intentionality in the Writing Process: A Case Study." College Composition and Communication 31 (May 1980): 153-59.

Lutz, Jean. "A Theoretical View of the Composing Process in Technical Communication." In Technical Communications: Perspectives for the Eighties (Proceedings of the 32nd CCCC). Ed. J. C. Mathes and T. E. Pinelli. Hampton, Virginia: NASA, 1981, pp. 389-97.

Mair, David and Nancy Roundy. "Composing Process of Technical Writers: A Preliminary Study." In Technical Communications: Perspectives for the Eighties (Proceedings of the 32nd CCCC). Ed. J. C. Mathes and T. E. Pinelli. Hampton, Virginia: NASA, 1981, pp. 543-49.

Mandel, Barrett J. "The Writer Writing Is Not at Home." College Composition and Communication 31 (December 1980): 370-77.

Moffett, James. "Writing, Inner Speech, and Meditation." College English 44 (March 1982): 231-46.

Murray, Donald. "Writing as Process: How Writing Finds Its Own Meaning." In Eight Approaches to Teaching Composition. Ed. Timothy R. Donovan and Ben McClelland. Urbana: NCTE, 1980, pp. 3-20.

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Perl, Sondra. "Creativity and the Composing Process: Making Thought Visible." Convention paper, Conference on College Composition and Communication, March 1981.

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THE GUIDED DESIGN APPROACH TO THE TEACHING OF TECHNICAL COMMUNICATION

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I. Background

Guided Design is a teaching method being used by innovators across the country as an alternative to lectures, case-studies, and discussion groups. Originated at West Virginia University under an Exxon Impact grant, Guided Design now boasts a staff, a library of materials, a Board of Directors, and a Center located on the WVU campus in Morgantown. The first national conference on Guided Design was held in May 1980 with one hundred fifty people in attendance, and workshops introducing the method have been and are being conducted all over North America. Converts are being won virtually every week, if not every day.

II. Definition

Guided Design is based on five educational principles--guidance, practice, evaluation and feedback, motivation, individualization. It is an approach which uses presentations of subject matter plus decision-making activities based on carefully planned open-ended problems. This method has as its objectives increased motivation, retention of subject matter, development of decision-making skills, and increased ability to use skills independently to arrive at solutions to problems. This is a strategy which is part system, part attitude, allowing instructors to accomplish simultaneously two goals which are

usually not combined: 1) the learning of subject matter, 2) the application of decision-making skills to professional problems. Through Guided Design, the instructor models reasoning and demonstrates to the students that they can themselves apply skills to the solution of rhetorical, organizational, and interpersonal problems. Guided Design is based on the theory that the person who works through a series of situations of increasing complexity, seeking the best solutions to various dilemmas, will be both better educated and better able to learn even more.

III. Process

The process in Guided Design is organized around the learners' efforts to make wise decisions. While there is no single correct answer to any of the problems posed, each requires learners to put into play specific information or skills acquired in the course. The instructor selects the problems according to the skills and subject matter the learners are expected to use and prepares written instruction-feedback material which guides the students through a model solution. There are, then, four elements in the Guided Design process:

A. Presentation by the instructor of resource materials such as lectures, textbook materials, audio-visuals

B. Three levels of written materials prepared and distributed by the instructor: 1) Description of the situation 2) Instructions which follow the steps of a structured decision-making process 3) Feedback to the students' responses

C. Constant as well as final evaluation

D. Single open-ended problems or a series of increasingly complex problems which demand use of skill and/or knowledge.

It should be noted here that a course can be based entirely on Guided Design, or appropriate Guided Design components and activities can be included in a course using other methods as well.

IV. Rationale

While the traditional lecture method is useful in the passing on of facts, it is not suited to development of high-level intellectual skills and attitudes. Other methods such as group discussion tend to stimulate skill development in group dynamics and oral communication, but they fall short in terms of a demand for cognitive background and application of specific pre-professional or professional skills.

At the same time, there is a desperate need throughout society for persons who have been educated in the process of problem-solving and decision-making, particularly on ethical and moral bases. There is, furthermore, a need for students to encounter realistic situations modeled on actual professional roles. Students do need experience in group dynamics, authoritative versus non-authoritative behaviors, and organizational operation.

Students in technical communication particularly need to develop the image and attitudes of professionals.

Finally, students need to be moved from what Bloom called the cognitive level of learning to the highest possible levels--analysis, evaluation, and synthesis.*

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*Bloom, Benjamin S., Ed., with Max D. Engelhart, Edward Furst, Walter Hill and David Krathwohl, Taxonomy of Educational Objectives: The Classification of Educational Goals, David McKay Company, Inc., New York, 1956.

By focusing on both decision-making and the acquisition of skills and knowledge, the Guided Design approach brings a discipline such as Technical Communication to life as the tool of an active mind seeking orderly solutions to complex problems. Learners not only acquire specific skills and knowledge within the discipline but also develop their ability to learn on their own, think logically, gather the information they need to make intelligent decisions, make value judgments, and communicate their ideas to others.

V. Advantages

In terms of student response, some of the more obvious advantages of this approach to teaching-learning can be listed as follows:

A. Greater realization of the need for and better retention of subject matter

B. Higher quality work on assignments

C. Higher motivation

D. Better class attendance

E. Realization of professional roles

F. Increased sense of relevance of classroom experience to professional expectations

G. Experience in group decision-making

H. Experience in realistic feedback situations--"You may have had a better idea, but--"

I. Greater sense of accomplishment

J. Immediate feedback

K. Greater quantity of work accomplished

L. Internalization of problem-solving, decision-making techniques

M. Increased ability to <u>think</u>, to use reason and logic

VI. Disadvantages

The disadvantages to using Guided Design are primarily instructor-related, primarily because Guided Design involves a change in orientation from other methods. Though less numerous than the advantages, the disadvantages should certainly be recognized, as follows:

A. More preparation time prior to the beginning of the course

B. Necessity for frequent revision of materials

C. More difficulty in dealing with diversity of student background and motivation

D. More dependence upon faculty and staff colleagues and consultants (depending upon the nature of the problems posed)

E. Limits on class size (Guided Design is difficult to use in classes enrolling over twenty-five students.)

F. Demand for evaluation of individual students in group situations

G. Demand for storage space for written materials!

VII. Role of instructor

The role of the instructor in a course based on or using components of Guided Design can be summarized as follows:

A. Design of course, setting of objectives, choosing of textbook and other subject matter materials

B. Analysis of skills to be learned and applied through Guided Design components

C. Design or locating of Guided Design components

D. In-class presentation of content and demonstration of skills

E. Service as role-player, consultant, evaluator, source of feedback for Guided Design components

F. Revision of materials as necessary

G. Evaluation of student achievement

VIII. Testimonial

Application of the Guided Design approach to the Advanced Technical Writing course at Alderson-Broaddus College has proved effective to the point that the course is firmly established in this mode. (See Appendices.) Also, Guided Design principles and components are being used in the introductory technical writing course and are being introduced or considered in all other communications courses throughout the college.

IX. Sources of Further Information

Written materials and workshop administration:

Center for Guided Design
Engineering Sciences Building
West Virginia University
Morgantown, WV 26505
(304) 293-3445
Dr. Charles Wales, Director
Dr. Anne Nardi, Associate Director

Film:

#31864 "Guided Design"
Film Scheduling Center
Modern Talking Picture Service, Inc.
5000 Park Street, North
St. Petersburg, FL 33709
(813) 541-6661

Barbara Smith, Instructor
W-B 201--Ext. 301
Office Hours: 8-10:30 AM

Summer, 1980-81

Appendix A
Syllabus of Course Using
Guided Design

English 265: Advanced Technical Writing

Purpose of the Course: The purpose of English 265: Advanced Technical Writing is to direct the student toward

1. Increased cognitive knowledge concerning the content and methods of technical communication.
2. Increased positive attitude toward the pragmatic and ethical value of technical communication.
3. Increased cognitive knowledge of a second field of interest of the student's own choice.
4. Development of skills that will lead toward initiation and effective completion of independent projects in technical communication.
5. Increasing ability in situation and audience analysis and decision-making.
6. Increased understanding of and skill in human relations.
7. Improvement of specific technical writing skills such as proposal writing, editing, specification writing, and graphics design.

Objectives of the Course: By the time the student completes English 265 he should be able to

1. Communicate in writing and/or orally information from a given technical field to various types of technical and non-technical audiences.
2. Analyse in writing and/or orally simple and complex audiences.
3. Discuss orally and/or in writing the tasks appropriate to technical communication.
4. Analyse in writing and/or orally a technical communications situation or problem.
5. Analyze in writing and/or orally a situation or problem in a second field of the student's choice.
6. Practice in writing and/or orally a logical and systematic decision-making process.
7. Design various types of reports appropriate to various audiences and various rhetorical tasks.
8. Design graphics appropriate to various audiences and various rhetorical tasks.
9. Edit technical writing materials toward full effectiveness.

Content of the Course: The content of English 265 will include

1. Reading and application of textbook materials.
2. Group projects using Guided Design.
3. Individual projects resulting in useable technical writing projects.
4. Exploration and practice of graphics design.
5. Testing related to all of the above.

Textbooks for the Course: The student should own and make extensive use of

1. Designing Technical Reports, J. C. Mathes and Dwight Stevenson, Bobbs-Merrill Company, Inc., Indianapolis, 1976.
2. Technical English, Nell Ann Pickett and Ann Laster, 2d edition, Canfield Press, San Francisco, 1975.

Evaluation of the Course: Final grades for English 265 will be determined as follows:

1. Written reports related to group and individual projects	40%
2. Final project (oral and written)	40%
3. Preparation and participation	20%
	100%

Policies Related to Course:

1. Class Attendance--You are needed in this class, and it is hoped that at least occasionally you will feel that you need the class. Therefore, while no rigid rules of "no absences" or "two and one-half absences only" will be applied, attendance will be closely watched, and note will be made thereof under the heading of "participation." When a

student's standing in the course is in jeopardy for any reason (grades, attendance, or otherwise), he will be given one warning in writing and in conference, and if the problem persists, he will be asked to withdraw from the course or will receive a grade of "F."
NOTE: No make-ups will normally be allowed for in-class work--including tests. If good reasons are presented for absence, the grade will simply not be counted. If no good reasons are presented, the grade will be considered a zero.

2. Plagiarism--Anyone who uses the words or ideas of another writer without clear and explicit acknowledgement is guilty of plagiarism. One can easily avoid plagiarism by noting the exact source and page used in taking notes and then making one's source clear through a footnote reference. When in doubt about such matters, consult "A College Style Sheet," your textbook, or the instructor. A student guilty of plagiarism will be dismissed from the course with a grade of "F," and his situation will be reported to the Dean of Instruction and the Dean of Students.

Final Exam: The final exam will be given at the time designated by the registrar and at other times close to that and at the convenience of the student and the instructor. The student will meet individually with the instructor and will present the written individual report. Where appropriate, the student will by this time have presented the report to a supervisor in the field which is the subject of the report, and that supervisor will have forwarded to the technical writing instructor a brief written evaluation. This evaluation will be included in the discussion during the student's final examination. Full instructions regarding the written report will be given during class sessions.

Note: The educational approach used in this course is based on the Guided Design concept developed by Charles E. Wales and Robert A. Stager of West Virginia University. Materials such as the Design Decision Tables have been adapted from The Nature of Evidence, a Guided Design course designed and copyrighted by Gene D'Amour and Charles E. Wales.

Schedule for English 265

Class Period	Activity	Textbook Assignment
1--June 2	Introduction to Course	Chapter 1: The Tech. Comm. Process
2--June 3	Introduction to Guided Design	" "
3--June 4	Guided Design, Project I	Chapter 2: Audience Analysis
4--June 5	" " "	" "
5--June 8	" " "	" "
6--June 9	Discussion of Textbook	Review
7--June 10	Guided Design, Project I	Chapter 3: The Problematic Context
8--June 11	" " "	" "
9--June 12	Discussion of Textbook	Review
10--June 15	Quiz, Discussion of Individual Projects	Chapter 8: Editing Sentences
11--June 16	Guided Design, Project II	Chapter 8: Editing Sentences
12--June 17	" "	" "
13--June 18	" "	" "
14--June 19	" "	" "
15--June 22	" "	" "
16--June 23	Discussion of textbook	Review
17--June 24	Quiz, Discussion of Individual Projects	Chapter 4: Designing Basic Report
18--June 25	Guided Design, Project II	" "
19--June 26	" "	" "
20--June 29	" "	" "
21--June 30	" "	" "
22--July 1	Discussion of textbook	Review
23--July 2	Quiz, Discussion of Individual Projects	Chapter 5: Designing Opening
24--July 6	Guided Design, Project III	" "
25--July 7	" "	" "
26--July 8	" "	" "
27--July 9	" "	" "
28--July 10	Discussion of textbook	Review
29--July 13	Guided Design, Project III	Chapter 6: Designing Discussion
30--July 14	" "	" "
31--July 15	" "	" "
32--July 16	" "	" "
33--July 17	Discussion of text	Review
34--July 20	Guided Design, Project III	Chapter 9: Addition Design Features
35--July 21	" "	" "
36--July 22	Quiz, Discussion of Individual Projects	" "
37--July 23	Individual Projects	" "
38--July 24	" "	Chapter 10: Report...Checklist
39--July 27	" "	" "

Skills Built into Guided Design Projects

Project I: To Be or Not To Be Published

Audience Analysis
Rhetorical Task Analysis
Sentence Editing

Project II: Buford and the Foundation

Audience Analysis
Rhetorical Task Analysis
Design of Basic Report Structure
Design of Discussion Component

Project III: Starting from Scratch

Audience Analysis
Rhetorical Task Analysis
Design of Basic Report Structure
Design of Discussion Component
Additional Design Features: Layout
Report Design: Guide and Checklist
Business Forms

Project IV: Individual Project

All of the above plus graphics design

Appendix B
Sample Guided Design Situations

#1

To Be or Not to Be Published

The president of your organization has called you, his chief technical writer, into his office for a private conference. It seems that his cousin, who is a prominent lawyer in the community in which your company is located, has written a history of the Bar Association in your state. However, the three publishers who have seen the manuscript have rejected it. The president of the company has called you in to ask you to do something with the manuscript, and he is offering a substantial incentive--a stipend large enough to send you and your family to Europe for a month this summer.

#2

Buford and the Foundation

Frances Buford is the executive vice president of Singleday, a large book-publishing company. In the mail this morning Buford received a letter from the Solare Foundation stating that the Singleday proposal for a grant to power an anticipated new building with solar energy has been rejected.

During the next few days each of you will play the role of Buford, an executive who makes decisions--and who now has a problem facing her. All of you in the group who are not playing the role of Buford will serve as advisors. All of you--Buford and advisors--have had experience in technical writing, but none of you is primarily or solely a technical writer. Now--read and discuss the letter.

When you have talked over the implications of the letter, choose a temporary project leader (Buford) to report to your instructor (the boss) for further instructions.

#3

Starting from Scratch

You have been hired to set up a Technical Writing Department in a new branch of IMB (International Machines for Business) in Pocatello, Idaho. You are new to the community and new to IMB, having been a free-lance technical writer until now. Your supervisor, who is the Vice President of Operations for the Pocatello office, has been with IMB for twenty years, but his academic background is in computer programming, and until two weeks ago he served as chief of data analysis in the Chicago office. Until now he has had no direct contact with technical writers. He will arrive in Pocatello in ten days but will be in the office for only two days before he leaves for a three-week executive training conference in Washington. You were hired and received your job description from Dick Edwardson, an executive in the San Francisco office. He has described your supervisor as "very demanding but fair," and he has described Pocatello as "the boonies." There has never before been a technical writing department in the Pocatello office. There is one other technical writer in the office, Jane Dalton, but she now plays a managerial role. You have just received a memo from your new supervisor. (See page 2)

RESOURCES FOR TEACHING BUSINESS AND PROFESSIONAL SPEAKING FOR STUDENTS OF TECHNICAL COMMUNICATION

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The general importance of effective oral communication in the professional environment has been emphasized in a number of studies.[1] The specific importance of effective oral communication to the technical communicator has been determined clearly in two recent surveys. In his survey of 905 members of Class of 1973 and Class of 1976 alumni of Michigan Technological University, Peter M. Schiff notes that "effective technical communication calls for an additional skill--that of speaking."[2] Schiff asked respondents to rate specific communication tasks for job-related importance and frequency of performance; he discovered the high correlate importance of oral communication and written communication.

SCHIFF SURVEY OF COMMUNICATION TASKS
(Ratings of Top Ten)

RANK	TASK
*1	One-to-one talks with technically sophisticated personnel
2	Writing using graphs, charts, and/or other aids
3	Project proposals (written)
*4	Participation in a small group or committee made up of only technically sophisticated members
5	Instructions for completing a technical process (written)

*6 One-to-one talks with non-technical personnel

7 Project progress reports (written)

*8 Project proposal presentations (oral)

9 Writing technical information to non-technical audiences

*10 Oral presentations using graphs, charts, and/or other aids

Schiff concludes that "not only did alumni consider speaking skills crucial, but they also reported the need to display those skills frequently. Over 50% of the respondents had job-related spoken communication with technical personnel on at least a daily basis and over 50% of respondents had job-related spoken communication with non-technical personnel on at least a weekly basis."[3]

In her survey, Suzanne Pullon Fitch examined the specific oral communication requirements of research scientists.[4] She asked 132 scientists in petroleum, chemical, biological and contract research to rank eight oral communication skills on a scale of from one to eight, with one being the most valuable and eight being the least valuable. Seventy-eight respondents, 59% of the sample, returned the survey with the following results:

FITCH SURVEY OF ORAL COMMUNICATION SKILLS
FOR RESEARCH SCIENTISTS

RANK	SKILL (average ranking)
1	Routine information exchange (3.0)
2	Formal paper presentations with the use of visual aids (3.1)
3	Small group techniques: participating in small groups or conferences (3.2)
4	Small group discussion leadership: chairing small, informal problem-solving meetings (3.7)
5	Instructing/teaching techniques (4.3)

6 Public speaking before a large group (5.3)

7 Formal paper presentations without the use of visual aids (5.5)

8 Parliamentary leadership: chairing large, formal group meetings (7.1)

The findings of Fitch's survey and Schiff's survey indicate the need for a range of oral communication competencies for the technical communicator. Acquiring these abilities is a process that takes time and practice which oftentimes is unavailable to the technical student because of the burdens imposed on him by his technical requirements.[5] But the teacher of technical communication can at least provide an introduction to these oral communication activities by integrating the various oral skills in the study and practice of business and professional speaking. Obviously, the most desirable situation is one in which the student has education in-depth in each area of communication, but the student can at least began achieving greater competency through an intensive exposure to one-to-one oral communication, small group communication, and professional public speaking. The remainder of this paper presents resources for the teacher of technical communication to draw upon in teaching these various areas.

ONE-TO-ONE COMMUNICATION: INTERVIEWING

For the student of technical communication interviewing is an important skill for gathering and disseminating information and ideas; Interviews are ranked 1 and 6 by Schiff's respondents and 1 by Fitch's respondents. To be an effective participant in an interview, the student must be aware of his communication abilities and the factors that effect communication in one-to-one situations that have a specific goal to be reached, whether it be to give advice or information concerning a problem or to solve a problem. The resources noted below are designed to help

achieve this.

Readings

Downs, Cal W., et al. Professional Interviewing. New York: Harper and Row, 1977.

Samovar, Larry A. and Susan A. Hellweg. Interviewing: A Communicative Approach. Dubuque, IA: Gorsuch Scarisbrick, 1982.

Stano, Michael E. and N. L. Reinsch, Jr. Communication in Interviews. Englewood Cliffs, NJ: Prentice-Hall, 1982.

Stewart, Charles J. and William B. Cash. Interviewing: Principles and Practices. 3rd edition. Dubuque, IA: William C. Brown, 1982.

Stewart, Charles J. Teaching Interviewing for Career Preparation. Falls Church, VA: Speech Communication Association, 1976. (This is a Theory Into Practice text available from the ERIC Clearinghouse on Reading and Communication Skills, 1111 Kenyon Rd., Urbana, IL 61801. Highly recommended for its concise, clear presentation of essential concepts.)

Wolvin, Andrew D. and Carolyn Gwynn Coakley. Listening Instruction. Falls Church, VA: Speech Communication Association, 1979. (Another Theory Into Practice text available at the preceding address.)

Films/Videotapes

Interviewing. Videotape. 26 minutes. Available for rent, preview or purchase. Marketing Division, Instructional Media Center, Michigan State University, East Lansing, MI 48824 (517) 353-9229.

The Interview. Film. 6 minutes. Films incorporated, 1144 Wilmette Avenue, Wilmette, IL 60091.

Listen, Please! Film. 12 minutes. BNA Communications Inc., 9401 Decoverly Hall Road, Rockville, MD 20850.

Effective Listening. Film. 15 minutes. Centron Educational Films, 1621 Ninth St., Lawrence KS 66044.

Games/Simulations

"Commercially Available Games for Speech Communication Courses." The Speech Teacher, November, 1974, 4:312-319.

Covert, Anita and Gordon L. Thomas. Communication Games and Simulations. Falls Church, VA: Speech Communication Association, 1978. (Another Theory Into Practice text available from the ERIC Clearinghouse on Reading and Communication Skills, 1111 Kenyon Rd., Urbana, IL 61801.)

Pfeiffer, J. William and John E. Jones. A Handbook of Structured Experiences for Human Relations Training. LaJolla, CA: University Associates, vols. I, II, III, IV, V, 1969-1975, Reference Guide, 1975, Annuals 1970-1975.

Ruben, Brent D. Human Communication Handbook: Simulations and Games. Rochelle Park, N.J.: Hayden Book Company, vol. 2, 1978.

Ruben, Brent D. and Richard W. Budd. Human Communication Handbook: Simulations and Games. Rochelle Park, N.J.: Hayden Book Company, vol. 1, 1975.

SMALL GROUP COMMUNICATION

Communication in small groups is a major activity in the professional environment. Schiff's respondents rank small group communication 4 and Fitch's respondents rank it 3 and 4. Professional groups primarily assess information and ideas of group members in order to reach a most defensible position concerning the truth or falsity of some

matter when they deal with questions of fact, concerning the future probabilities and possibilities when dealing with questions of conjecture, or concerning a course of action to be pursued when dealing with questions of policy.[6] Functioning effectively in groups requires a clear understanding of the variables that affect group communication as well as sufficient practice in group activities for the student of technical communication. A part of a single course can help this, but incorporation of substantive group activities in all courses would be most effective and close to reality.

Auger, B. Y. How to Run Better Business Meetings. St. Paul, MN: 3M Company, 1972.

Book, Cassandra and Kathleen Galvin. Instruction In and About Small Group Discussion. Falls Church, VA: Speech Communication Association, 1975. (Another Theory Into Practice text available from the ERIC Clearinghouse on Reading and Communication Skills, 1111 Kenyon Rd., Urbana, IL 61801.)

Brilhart, John K. Effective Group Discussion. 4th edition. Dubuque, IA: William C. Brown Company, 1982.

Cragan, John F. and David W. Wright. Communication in Small Group Discussions: A Case Study Approach. St. Paul, MN: West Publishing Company, 1980.

Jewell, Lina N. and J. Joseph Reitz. Group Effectiveness in Organizations. Glenview, IL: Scott, Foresman and Co., 1981.

Jones, Stanley E., et al. The Dynamics of Discussion: Communication in Small Groups. 2nd edition. New York: Harper and Row, 1980.

Patton, Bobby R. and Kim Giffin. Decision-Making Group Interaction. 2nd edition. Harper and Row, 1978.

Phillips Gerald M. et al. Group Discussion: A Practical Guide to Participation and Leadership. Boston: Houghton Mifflin, 1979.

Potter, David and Martin P. Andersen. Discussion in Small Groups: A Guide to Effective Practice. 3rd edition. Belmont, CA: Wadsworth Publishing Company, 1976.

Films/Videotapes

Challenge of Leadership. Film. 15 minutes. BNA Communications, Inc., 9401 Decoverly Hall Road, Rickville, MD 20850.

Engineering Agreement. Film. 18 minutes. Roundtable Productions. Beverly Hills, CA 90213.

Group Dynamics: "Group Think". Film. 22 minutes. McGraw-Hill Films, 110 15th Street, Del Mar, CA 92014 (714) 453-5000.

How to Conduct a More Productive Meeting. Videotape. 25 minutes. Time-Life Video. 100 Eisenhower Drive, P.O. Box 644, Paramus, N.J. (201) 843-4545.

One-Sided Triangle. Film. 24 minutes. BNA Communications, Inc., 9401 Decoverly Hall Road, Rockville, MD 20850.

Small Group Communication. Videotape. 24 minutes. Available Marketing Division, Instructional Media Center, Michigan State University, East Lansing, MI 48824.

Styles of Leadership. Film. 26 minutes. Roundtable Productions, Beverly Hills, CA 90213.

Games/Simulations

See references under ONE-TO-ONE COMMUNICATION: INTERVIEWING.

PROFESSIONAL PUBLIC SPEAKING

In the professional public speaking situation, the technical communicator is presenting material that must be conveyed to his

audience with precision and accuracy. Thus he often "reads" a paper to the audience; Schiff's respondents ranked this type of activity 8 and 10, while Fitch's group, probably reflecting their research orientation, ranked it 2. Unfortunately, "read" is all too accurate a description of the presentations made by most technical communicators. "As a matter of fact," Ben F. Dickerson says, "you would think most of the speakers had taken intensive training in how not to give a paper. Endless unemphasized mumbles, interrupted only by uhs, has apparently become an accepted art form. When these are accompanied by undeciperable illustrations and purposeless thought processes, you don't have to look any further for the reason behind the usual poor attendance at sessions."[7] To be fully effective in their public speaking, students of technical communication must be aware of and practice the distinctions between oral and written language and the distinctions between merely reading and expressing one's thoughts for aural consumption. In addition to the distinctions that add to the stylistic impact of his presentation, the technical communicator must learn to make use of graphic communication through visual aids to support his presentation and, if used well, increase its effectiveness. Finally, the technical communicator must become accustomed to adapting to media technology and to performing for the media; electronic media are becoming more pervasive as business and industry adapt audio and video media for corporate use.[8]

Readings

General

Bradley, Patricia H. and John E. Baird, Jr. Communications for Business and the Professions. Dubuque, IA: William C. Brown, 1980.

Capps, Randall, et al. Communication for the Business and Professional Speaker. New York: MacMillan, 1981.

Eisenberg, Abne M. Understanding Communication in Business and the Professions. New York: MacMillan, 1978.

Frank, Allan D. Communicating on the Job. Glenview, IL: Scott, Foresman and Company, 1982.

Geonetta, Sam C. "Increasing the Oral Communication Competencies of the Technological Student: The Professional Speaking Method," Journal of Technical Writing and Communication, 1981, 3:233-244.

Howell, William S. and Ernest G. Bormann. Presentational Speaking for Business and the Professions. New York: Harper and Row, 1971.

Joenk, R. J. IEEE Transactions on Professional Communication, March, 1980, 1:3-60.

Koehler, Jerry W. and John I. Sisco. Public Communication in Business and the Professions. St. Paul, MN: West Publishing Company, 1981.

Lerond, Jack M. "How to Master Oral Briefing Styles,"Hydrocarbon Processing, October, 1967, 46:175-182.

O'Connell, Sandra E. The Manager as Communicator. New York: Harper and Row, 1979.

Powell, J. Lewis. Executive Speaking: An Acquired Skill. 2nd edition. Washington, D.C.: The Bureau of National Affairs, 1980.

Samovar, Larry A., et al. Speech Communication in Business and the Professions. Belmont, CA: Wadsworth Publishing Company, 1981.

Tacey, William. Business and Professional Speaking. 3rd edition. Dubuque, IA: William C. Brown, 1980.

Thomas, David A. and Maridell Fryar. Successful Business Speaking. Skokie, IL: National Textbook Company, 1981.

Audiovisual/Graphics

Catalog of Educational Materials. Eastman Kodak Company, 343 State Street, Rochester, NY 14651.

The Communicator's Catalog. See above address.

How to Create Overhead Projection Transparencies That Get Attention. Visual Products Division, 3M Company, 3M Center, St. Paul, MN 55101.

Kemp, Jerrold E. Planning and Producing Audiovisual Materials. 4th edition. New York: Harper and Row, 1980.

Pett, Dennis W. Copying and Duplicating Processes. Bloomington, IN: Audiovisual Center, n.d.

Planning and Producing Slide Programs. Eastman Kodak Company Publication S-30. Eastman Kodak Company, 343 State Street, Rochester, NY 14651.

Speechmaking...More Than Words Alone. Eastman Kodak Company Publication S-25. See above address.

Visual Design: A Program for the Design Professional. Eastman Kodak Company Publication V1-36. See above address.

Media

Agostino, Donald et al. Teaching Interpersonal Skills to Health Professionals: Using Videotechnology, Manual V. Atlanta, GA: National Medical Audiovisual Center, 1978.

Bland, Michael. The Executive's Guide to TV and Radio Appearances. White Plains, NY: Knowledge Industry Publications, 1980.

Hawes, William. The Performer in Mass Media. New York: Hastings House, 1978.

Hindman, James et al. TV Acting. New York: Hastings House, n.d.

King, James C. "How to Use, Not Abuse, Microphone Placement." EITV, February, 1978, 10:28-29.

Mattingly, Grayson. "Video Grammar." EITV, January, 1979, 11:36-39.

Nisbett, Alec. The Use of Microphones. London: Focal Press Ltd., 1974.

Utz, Peter. The Video User's Handbook. Englewood Cliffs, NJ: Prentice-Hall, 1980.

Waaser, Caol. Sound and Music for the Theatre. New York: Richards Rosen Press, 1976.

Films/Videotapes/Slide-Sound

Effective Visual Presentations. Eastman Kodak Sound-Slide-Film Program V10-10. 18 minutes. Eastman Kodak Company, 343 State Street, Rochester, NY 14651.

Microphone Speaking. Film. 15 minutes. Centron Educational Films, 1621 West Ninth Street, Lawrence, KS 66044.

Performing. Videotape. 20 minutes. Visual Products Division, 3M Company, 3M Center, St. Paul, MN 55101.

Public Speaking: The Purpose Sentence. Videotape. 17 minutes. Marketing Division, Instructional Media Center, Michigan State University, East Lansing, MI 48824.

This paper has provided a basic rationale for the incorporation of business and professional speaking activities into the curriculum for students of technical communication. One-to-one communication: interviewing, small group communication, and professional public speaking should be studied in-depth, but achieve fullest effectiveness when incorporated into all levels of educational activity for students. Resources that provide a range of materials and activities have been

presented for each area. The individual should tailor materials to the needs of his students and their responses to the activities. For a packet of materials that I have used, please write: Sam C. Geonetta, Department of Speech and Media Studies, The University of Missouri-Rolla, Rolla, MO 65401.

NOTES

1 John E. Baird, Jr. The Dynamics of Organizational Communication (New York: Harper and Row, 1977), pp. 2-3; William Gorden and John Miller. Speak Up for Business (Dubuque, IA: Kendall/Hunt, 1977), pp. 7-8; Larry A. Samovar, et al. Speech Communication in Business and the Professions (Belmont, CA: Wadsworth Publishing Company, 1981), pp. 2-3.

2 Peter M. Schiff, "Speech: Another Facet of Technical Communication," Engineering Education, November, 1980, p. 180.

3 Schiff, p. 180.

4 Suzanne Pullon Fitch, "Communication Education for the Research Scientist," Communication Education, February, 1980, p. 62.

5 Paul E. Torgersen, "Engineering Education and the Second Obligation," Engineering Education, November, 1979, pp. 169-174.

6 See Dennis S. Gouran. Discussion: Process of Group Decision-Making (New York: Harper and Row, 1974), Chapter 4, for a discussion of the various discussion questions.

7 Ben F. Dickerson, "Beside Your Specialty--What Else Should You Know?", Mining Engineering, January, 1981, p. 92.

8 For a discussion of applications and scope of media in business and industry see John A. Bunyan et al. Practical Video (White Plains, NY: Knowledge Industry Publications, 1978) and John A. Bunyan and James C. Crimmins. Television and Management (White Plains, NY: Knowledge Industry Publications, 1977).

POSSIBLE APPLICATIONS OF COGNITIVE SCIENCE AND PROBLEM SOLVING TO TECHNICAL WRITING

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Recent researchers in cognitive science and problem solving are concerned mainly with how the mind works and how to improve man's ability to communicate with his fellow man and with machines. The methods and results of their endeavors offer new possibilities for the theory and practice of technical writing. They provide a scientific basis for the focus on writing and reading as process and for the examination of technical writing's future in a computerized society.

My selective discussion of these new possibilities is divided into three parts:

1. the establishment of a working definition of "cognitive science"

2. the consideration of how our understanding of cognitive science might influence our approaches to scholarship and teaching

3. the presentation of specific examples of how a)the theory, and b)the methodology of cognitive science might be applied to significant research and curriculum development in technical writing programs.

1. What is Cognitive Science?

The discipline is surveyed by Morton Hunt in The Universe Within (New York: Simon and Schuster, 1982). In an article in the NY Times Sunday magazine (1/24/82), Hunt summarizes his book and provides the

following definition: "Cognitive science is concerned with a system of processes for manipulating information"(p.33). In other words, it is a study of how the human brain functions as an information processing system made up of separate but related units.

As many of you know, this way of viewing the human mind evolved in part from recent studies of information processing in the computer sciences, particularly in the area of Artificial Intelligence. Psychologists such as Herbert A. Simon and computer scientists such as Alan Newell (both from Carnegie-Mellon University) noted an analogy between what a computer does from first to last in order to process information and what the mind does. A computer "transforms punched-in letters into digital bits, routes these to where they can be recognized or stored, retrieves them as needed, puts them to work according to the program and the operator's commands, and eventually changes them back into a readable display on a screen or paper." The mind performs parallel tasks to achieve similar goals.

Along with this fresh perspective on the mind's function has come a renewed interest in the art of problem solving. Universities such as Carnegie-Mellon and Michigan State have held symposiums and published proceedings that reassess an old pedagogic question: should institutions of higher education stress the teaching of knowledge or the teaching of skills necessary to acquire and transmit knowledge, such as problem problem solving and decision making? And, if skills rather than domain-centered knowledge should be the focus, is there one effective way to teach problem solving across the curriculum, or does each discipline have a distinct methodology? Do minds function similarly on different subjects?

A final consensus has yet to be reached, but much has been learned in the attempt. For our purposes, when we consider the possible impact of cognitive science on technical writing, we are concerned with:

a. studies of the mind as an information processing system, prompted by work in Artificial Intelligence and Psychology

b. studies in the theory and teaching of problem solving pursued independently or interdepartmentally by several disciplines, notably Physics, Psychology, Engineering and Computer Science.

2. Impact on Approaches and Attitudes

To further define my terms and explain the effects these studies might have on our field, I need to ask technical writing teachers a question: how many of you think of yourselves as engineering professors? I ask, because one impact of cognitive science on technical writing may be a change in how we perceive what we are doing when we teach students how to write reports, memos, and manuals. The change in perspective may make engineering professors of us all (without the appropriate salary increases, I'm afraid).

For example, Prof. Frederick Reif (Physics, University of California, Berkeley) delivered a paper at the Carnegie-Mellon conference(1978) entitled "Theoretical and Educational Concerns with Problem Solving: Bridging the Gaps with Human Cognitive Engineering." To identify where the needs are in the study of information processing, Reif presents a table of subdivisions for the field of cognitive science (figure 1). One subdivision is according to who or what the information processor is (ie. computer or human being). The other subdivision, the more important one for our purposes, is according to the type of goal pursued in the study. If the goal is "descriptive,"

it is an attempt to understand or describe theoretically the properties of the information processor. If the goal is "prescriptive," it is to design information processors capable of performing various tasks effectively.

Subdivision of Cognitive Science According to Type of Information-Processing System and Type of Scientific Goal		
	Descriptive	*Prescriptive*
Computer	Computer science	Artificial intelligence
Human	Cognitive psychology	?? (Human cognitive engineering)

figure 1

It is the second subdivision of human-centered research, the "prescriptive," that Reif claims there is the greatest need for further work: "Who, using the approach of cognitive science, is systematically interested in studying modes of information processing specifically designed to improve human intellectual performance?" (Tuma/Reif, Problem Solving and Education, New Jersey, 1980, p. 43).

And it is in relation to this area of cognitive science, "human cognitive engineering," that I am suggesting technical writing programs and teachers might rethink what it is they do and how they might do it. In the sense that both technical writing and technical reading are acts of information processing and/or problem solving, the opportunity exists for technical writing instructors to teach better ways of information processing based on the findings of cognitive scientists. In the sense that they improve writers' understanding of the reading process, in the sense that they facilitate writers' ability to program, track or package technical material differently for each audience, all technical writing teachers are or could become professors of human cognitive engineering.

3. Sample Applications

The application of recent work in cognitive science and problem solving to technical writing is a placing of old wine in new bottles. Tom Huckin, for example, in "A Cognitive Approach to Readability" (forthcoming in the Anderson/Brockman/Miller anthology) observes in his comparison of readability formulas to the cognitive science approach that the main difference is the newer method's stress on the process of reading rather than the product to be read. His and others' research also suggests that cognitive science will be of most use to us in the already familiar area of audience adaptation.

If, for example, we accept the shift from product- to process-oriented writing instruction, then we are acknowledging that what writers know or can anticipate at the planning stage of writing about how their readers read has a more significant impact on readability than what writers can observe after writing about the average number of words in each sentence. It follows that we will want to employ cognitive science and problem solving to reassess our conceptions of 1.the writing process, 2.the reading process and 3. how the relationship between the two influences or might influence the planning stage of writing. We may also want to "borrow" the empirical methods employed by cognitive scientists to test and/or verify what we suspect or assume about the writing and reading processes and, consequently, provide verifiable data for our essay into human cognitive engineering.

Example #1 Application of Theory

In an article by four members of West Virginia University's engineering department (Plant, Dean, Sears, and Venable, "A Taxonomy

of Problem Solving Activities and Its Implications for Teaching, " in The Teaching of Elementary Problem Solving, American Society for Engineering Education, 1980, pp.21 ff., the authors present the five steps that are involved in all problem solving activities(figure 2).

A Problem-Solving Taxonomy (PST)

Most, if not all, problem-solving activities can be divided into five classifications: routines, diagnosis, strategy, interpretation, and generation.

There is no particular sequence for these classes of activity and in solving an actual problem the student will move back and forth among them according to the dictates of the particular problem. The following working definitions have been evolved for these activities:

Routines are those operations which, once begun, afford no opportunity for decision but proceed by simple or complex mathematical steps to a unique solution. Long division is a routine. The evaluation of a complex integral is a routine. The solution of a quadratic equation is a routine. The determination of the moment of inertia of a composite area about a centroidal axis is a routine. All of these depend only on the correct execution of a number of steps. The student may find it necessary to recall mathematical or physical facts in order to perform a routine but no decisions are necessary.

Diagnosis is the selection of the correct routine or routines for the solution of a particular problem. Diagnosis is sorting out correct routines from incorrect routines. Deciding on the flexure formula to find the stresses at a given point in a beam is diagnosis. Deciding on integration by parts for a given integration problem is diagnosis. In both cases there is only one way to go, but the student must find it. He must examine the problem until he finds a correct routine.

Strategy is the choice of a particular routine for the solution of a problem which may be solved by several routines or variations of routines, all of which are known to the student. Strategy is choosing among correct routines. The selection of a point about which to take moments is a strategy decision. The decision to use polar rather than cartesian coordinates is strategy. The use of the method of sections or of the method of joints in analyzing a truss is a matter of strategy.

Interpretation is the reduction of a real-world situation to data which can be used in a routine, and the expansion of a problem solution to determine its implications in the real world. It includes the making of appropriate assumptions and the interpretation of results.

Generation is the development of routines which are new to the problem-solver. It may simply be laying out a number of routines to put them together in new ways, in which case it is probably a matter of pure recall. It may be the bringing together of previously unrelated ideas to spark a new attack, in which case it is highly creative. It may be somewhere between these two extremes. It must result in an activity which is completely new to the problem-solver and which he has never been taught.

figure 2

If you consider these steps in terms of what a writer does when structuring a report and what a reader does when analyzing a report, you will realize that both writing and reading are problem solving activities, or, perhaps, are the two halves of one problem solving activity. Diagnosis, or choosing the right routine, for example, is comparable to what the writer does when he selects a problem/solution or comparison format for his material as opposed to the other alternatives. Correspondingly, his reader diagnoses the format that the writer has chosen in order to understand the material. If the writer has not committed himself to a recognizable and acceptable format, the reader must diagnose by imposing his own sense of order on the material. Similarly, Interpretation, the adaptation of routine to real-world situations, is a problem solving task performed by both writer and reader. If the writer's adaptation of his information to his reader's real-world situation is accurate, then all the reader needs to interpret is the analogy that the writer has provided. But if the writer has provided an unclear or unacceptable analogy, then the burden is entirely on the reader to interpret the implication of the material for his own circumstances.

Seeing writing and reading as problem solving operations parallel to those encountered by engineers has an advantage similar to that of Linda Flower's analysis of "writer-based" and "reader-based" prose. It stresses what must happen before and during writing and how these stages of the writing process are influenced right from the beginning by the final stage-- the process of reading.

Example #2 Application of Method

One method of collecting data that is repeated again and again

in the literature of cognitive science involves having the problem solver describe out loud how he problem solves as he is doing it. Even given the obvious drawbacks of this approach (i.e., distortion of reality), its adaptation to the recording and tabulating of different readers' sentence by sentence interpretation of a technical document or different writers' out loud planning of a technical document has potential.

Three brief examples will suggest how this method might function in technical writing.

1. Jill Larkin(Physics, Carnegie-Mellon) had several expert physicists and several novice physics students think aloud as they each solved an identical set of problems. Her purpose was to assess whether experienced physicists had more large-scale fundamental units for solving physics problems than beginning students. In Simon's terms, do experts think in "chunks," hierarchically rather than linearly? Larkin recorded the problem solving of each subject and produced graphs documenting the premise that experts problem solve differently than beginners because automatically they apply general principles of which beginners are not yet aware (Tuma/Reif, pp.111-123).

Is this also true of the difference between the way expert and beginning technical writers write and the way expert and lay readers read, and if so, what might it signify about how technical writing should be taught?

2. Lois Greenfield(Engineering, University of Wisconsin) writes about experiments done by Bloom, Broder, and Whimby with a peer-pairing system. Two students are paired and one problem solves out loud to the other so that the listener can determine what in this person's approach

makes his problem solving less effective than that of "good" problem solvers (in The Teaching of Problem Solving, 1980). Similar programs are being developed in which the computer rather than a peer plays the role of listener and coach(see Ira Goldstein in Tuma/Reif, pp.53ff.)

3.In my own industrial writing seminars, I have asked engineers to read each others' reports out loud, stop whenever something is unclear or disturbing, and describe their immediate reactions to the class. This kind of feedback is particularly effective because it gives the writer in fact what normally he can only fantasize: exactly what takes place step-by-step when the reader interacts with the writer's material.

One result of collecting data on how different writers and readers problem solve might be an increased ability to apply computer implemented problem solving models to technical writing. If we could document our belief that certain writing formats are most appropriate under certain circumstances, we might be able to develop computer programs to assist beginning students in making the correct choices. Adapting the If/Then mode currently used in computer programs for medical diagnosis, we could instruct students quickly and efficiently to identify and use the structure best-suited to a particular audience, situation, and type of information.

Conclusion

It is far too soon to be certain to what extent recent work in cognitive science and problem solving can or should be applied to the study and teaching of technical writing. But we will want, at least,

to closely consider what these fields have to offer us, particularly because of a) their stress on process over product, and b) what their methods of documenting human information processing can tell us about both technical writing instruction and technical writing as forms of human cognitive engineering.

NEW DIRECTIONS FOR GRADUATE STUDY IN SCIENTIFIC AND TECHNICAL COMMUNICATION PROGRAMS

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If there is a common thread that connects the presentations at this conference, it is the explosive growth that our scientific and technical communication programs across the country are experiencing. Coming at a time of shrinking enrollment and administrative support for many traditional fields of study, this growth is particularly impressive. Whether measured by student interest, faculty participation, course offering, publications, or research projects, our discipline is clearly showing signs of maturity and acceptance by both the professional and academic worlds. It is therefore appropriate that we step back from the immediate concerns caused by such growth to assess our intellectual progress, to ask whether we are developing a theoretical framework adequate to support the research and curriculum development for our courses, particularly at the graduate level. And, related to this question, whether graduate programs need to increase intellectual ties with other disciplines or concentrate more on establishing academic bases of their own.

Much of the success we're all experiencing can be attributed to

the outstanding work done by our senior colleagues to establish scientific and technical communication as a professional discipline, earning for themselves and the discipline the respect of those in industry and government where technical communication takes place. This trend, happily for us newer to the field, continues: note the number in our ranks who are hired regularly by companies and agencies to serve as consultants and teachers. This close association with the professional world is an important one, and we must never lose sight of its value to those of us inside the academies. By it, we are stimulated, kept up to date, and justify our students' belief that this field of study can lead to a satisfying productive career.

But--I don't mean this in a cautionary sense but as a positive conjunction--we also belong to the academic world where the development of theoretical understanding of subject matter equals in importance the transmission of professionally oriented concepts and practices. Indeed, it is exactly our commitment to this first that makes us of value to the world "out there." We have the opportunity and education to look behind practical problems that would seem to be matters of common sense and see theoretical systems at work or in conflict, to place those problems in a larger context, and thereby to offer more realistic, longer lasting solutions.

So much for the justification of the topic; next, the current state of affairs. If publications and conference proceedings provide any kind of accurate measure of scholarly activity, concerns with "how to do it" and "how to teach it" still dominate the field. Yet theoretical explorations are beginning to appear, even in journals traditionally associated with practice and pedagogy. For the most part the theories presented are derivative, looking to other disciplines, such as

traditional rhetoric, linguistics, literary studies, business management, even urban studies, for paradigmatic direction and insights. It is appropriate that in this stage of our history we make such cross-discipline forays. They, like our professional associations, serve to stimulate our own thinking as well as connect our work to the rich intellectual activities within the university setting. We cannot hope to achieve full academic acceptance for our field without such mainstream participation.

The real challenge is how to do this without losing our own hard-won identity, blurring what is unique to our discipline, or denying the possibility for original theorizing about scientific and technical communication. The following papers address this challenge and suggest theoretical directions that can best enrich our field and at the same time reveal its characteristic dimensions.

HOW NOT TO THEORIZE ABOUT TECHNICAL DISCOURSE

THE LESSON OF LITERARY THEORY

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The abstract for this panel suggests three important interrelated issues: first, the adequacy of the theoretical framework underlying technical discourse, second, the relation of technical writing to other disciplines, and third, the relation of technical discourse theory to pedagogy. This presentation addresses all three of these issues , though in varying degrees. Our approach is to use literary theory as an optic for illuminating the nature and direction of current technical discourse theory.

We begin with a few preliminary observations on attempts to define, and theorize about, technical writing. Though the question of the identity of technical discourse seems especially urgent now, it is not a new one. The question "What is technical discourse?" is not alien to literary theorists, for example. Yet, however valuable, their insights are primarily limited by their focus on literary, rather than on technical, discourse. Moreover, their focus on literature is often coupled with a naivete in the perception and treatment of technical

discourse. Technical writing theorists, on the other hand, do have their eye on the object, i.e., on technical discourse, but their theorizing is also limited, though for a different reason. Thus, while evidencing more familiarity with technical discourse, much of their theorizing lacks the speculative thrust that is not uncommon among, say, literary theories. In any event, technical writing theories have been too instrumentally oriented, too prescriptive, too aimed at providing a basis for pedagogy. The pedagogical orientation of much theorizing about technical discourse is illustrated in an (excellent) article by Dwight W. Stevenson entitled "Mapping the Unexplored Area," where we read that 'technical writing, as it is almost always called,is not in fact a single course. Rather, it is a whole variety of courses...."[1] Note the facile identification here of technical writing and coursework. In the same article, Stevenson goes on to exemplify the prescriptive use of instrumentally oriented theory. Specifically, he uses a definition of technical writing as a systematic basis for generating courses and curricula. Defining technical writing in terms of audience and purpose, Stevenson sets up a matrix "to identify needed technical writing courses and to define coherent sets of courses."[2]

Though such narrow use of theory undoubtedly has historical roots in the service-function role that technical writing has traditionally fulfilled in the academic structure, we don't mean to imply that relating theory to pedagogy is peculiar to technical discourse theory. In fact, certain literary theorists find almost as strong a relation between literary theory and related pedagogy. In an anthology entitled *What is Literature?*, for example, contributor F. E. Sparshott says,

> And after all, we do know why there are theories of literature. It is because literature must be taught and there must be a rationale for teaching it.... The question, "what is literature?" simply means, "What shall we choose for our stu-

> dents to read? How shall we justify our choice? What can we find to say about it, and how are our procedures to be justified?" The theory of literature is a rationale for curriculum selection and pedagogical procedure, and in the first instance that is all it is.[3]

We readily concede that one rationale for the question, "What is literature?", or in the case here, "What is technical writing?", is that the various answers to it make different claims about the stance a teacher assumes in the classroom, the orientation of textbooks, and the shape of curricula. What is characteristic of much technical writing theory is the *degree* and *pervasiveness* of the theoretical focus on pedagogy. More importantly, the focus on regulatory definitions destined for pedagogical implementation has distinct drawbacks. Specifically, it seems to have unduly inhibited the more speculative inquiry that is, as we noted earlier, *also* characteristic of literary theory.

A review of the literature suggests, moreover, that critics of technical writing definitions and theories are generally unconcerned with the paucity of speculative theory in the field. Rather, they have been preoccupied in challenging the truth claims of individual extant theories. In an earlier article, entitled "What is Technical Writing? Prolegomenon to a Contextual Definition," we examined perceived pitfalls in representative attempts at definition and the nature of the respective subsequent challenges.[4] The grounds for these challenges were seen there as terminological, methodological, or epistemological in nature. The analysis in that article led, moreover, to the conclusion that the various approaches discussed generally used narrowly conceived tactics leading ultimately to alienation. The insistence on the uniqueness of technical writing as a discipline, starting symbolically with the assignment of its name, is clearly contributory to alienation.[5] So is the characteristic methodological overemphasis on allegedly *distinguishing*, as opposed to *shared*, features. Equally contributory is the methodological privileging of binarism, for binarism is inherently an

agonistic notion, a one-on-one opposition, e.g., technical writing *versus* non-technical writing. The contribution of the epistemological privileging of scientific positivism to an ideology of alienation has been explored by such critics as Habermas and Marcuse.[6]

As we noted in the earlier paper, the alienation under discussion is manifested in several ways. On one level, it takes the form of classic dissociations from parent disciplines, that is, from composition, literature and rhetoric. This dissociation of technical writing at the disciplinary level was shown to have several correlatives. For instance, Marxist critic Stanley Aronowitz laments the "demoralization of teachers and their alienation from work" that results when their work, composition teaching, is separated from their training, literary studies.[7] Technical-writing teachers, cut off from composition as well as literature, would then presumably be seen as doubly alienated from the humanistic disciplines in which they were largely trained. Turning from the teacher to the student, we learn of an alienation originating in the dissociation of technical writing from traditional rhetoric. If traditional rhetoric views writing as a broadly humanistic discipline, then technical writing with its legacy of scientific positivism becomes a set of specialized skills practiced by a trained elite. Inculcation of this view in students may be seen as ultimately alienating them from a society lacking these skills.[8] Such alienation of technical professionals is, of course, yet another manifestation of that alienation known as the "two-cultures" syndrome.

Our previous discussion of growing alienation manifested in various ways and on various levels did not, however, tell the whole story. Post-positivist discourse theory suggests an alternative position, a position that would collapse the distinctions the positivists have struggled so hard to establish. As an example, consider the positivist's claim that technical discourse involves "an objec-

tive presentation of the facts." What is the post-positivist view of "the facts"? It rejects as false the positivist assumption of a one-to-one correspondence between words,on the one hand, and things or facts, on the other. It denies the existence of a fact independent of a context and of an observer. Facts are mediated, in their perception, by transformational devices referred to variously as images, cognitive maps, working models, and schemata.[9] Physicist Gerald Holton would agree: "The pattern we perceive when we note 'a fact' is organized and interpreted by a whole system of attitudes and thoughts, memories, beliefs and learned constructs."[10] For Thomas Kuhn, the transformational device is the paradigm, which is constitutive of both science and nature. In his words:

> What occurs during a scientific revolution [i.e., paradigm shift] is not fully reducible to a reinterpretation of individual data. In the first place, the data are not unequivocally stable.[11]

Knowledge of reality is thus contingent on, i.e., involves, a symbolic reconstruction of reality. In the view of sociologist Andrew Weigert, the theory and method of science are "symbolic communication whose principal form is intersubjective and principal function is rhetorical".[12] Thus, technical discourse is not a transparent vehicle for conveying Truth, with a capital T. It is, rather, a vehicle constituting a version of reality which is more or less persuasive and whose validation depends ultimately on its acceptance by the technical and scientific communities. The binary opposition of the demonstrable truth of technical discourse and the fiction of literature is thus collapsed. Both technical and literary discourses are symbolic reconstructions of reality--ultimately, fictions.

On the surface, the recent interest in shared features appears to be an antidote to the alienation we have viewed as attendant to the focus on distinctive features. There is some truth in this. But with the emphasizing of shared features, and the attendant fictionalizing of technical discourse, we have at the

same time cut ourselves off from what Karl Popper calls "resisting reality." In other words, we have simply exchanged one alienation for another. Disciplinary alienation has been supplanted by ontological alienation. This is clearly not the way to talk about technical discourse. Many of you will have caught an echo of chapters entitled "How not to Talk about Fiction" and "How not to Save the Humanities" in literary theorist Gerald Graff's latest book.[13] The echo is deliberate, for developments in technical discourse theory *do* parallel developments in literary theory in important respects. And Graff's analysis of the crisis situation of literature is particularly relevant to the present situation of technical discourse. According to Graff, literature is in a crisis state because literary theorists have defined their enterprise "in ways that implicitly trivialize it":

> As if our society had not rendered literature unimportant enough already, literary intellectuals have collaborated in ensuring its ineffectuality.[14]

Elsewhere, Graff explains:

> The aim of literary theorizing becomes not to understand the distinctive ways in which literature deals with experience so much as to exonerate literature (and the literary theorist) from social complicity. This exoneration is accomplished by divesting the literary work of its objective truth-claims, usually by the strategy of claiming that literary propositions do not present themselves as genuine beliefs, which is to say, claiming that they are not really propositions at all... By such logical strategies, well intentioned humanists argued themselves into a corner: at the very moment when external forces have conspired to deflate the importance and truth of literature, literary theory delivers the final blow itself.[15]

To back up his claim, Graff retraces a history of progressive abandonment of a truth claim for literature. The problem can be linked to a response to the Kantian premise that our minds are constitutive of reality, namely, to the inference that we cannot therefore test our ideas against the world. In their "critical exaggeration of the difference between literary and non-literary forms of language" and in their denial of the mimetic, referential function to literary

language, the New Critics made an important contribution.[16] The tendency culminates in the post-Structuralists' thematizing of the view that language is inherently incapable of referring to an external reality, that is, in the current "mode of interpretation that specializes in reading all literary works as commentaries on their own epistemological problematics."[17] Graff concludes his historical analysis with the following charge:

> Shaped by a love-hate relation with science, commerce, and practical life, our definitions of literature unwittingly concede the advantage to the adversaries.[18]

Unfortunately, science and technology cannot profit from Graff's wry generosity. For, with the fictionalizing of technical discourse by recent theorists, there is no one around to accept the gift.

So how do we talk about technical writing? The establishment of a new basis for a truth-claim by science and technology must be the overriding concern. Karl Popper attempts to provide such a basis when he asserts:

> Kant was right that it is our intellect which imposes its laws--its ideas, its rules--upon the inarticulate mass of our "sensations" and thereby brings order to them. Where he was wrong is that he did not see that we rarely succeed with our impositions, that we try and err again and again, and that the result--our knowledge of the world--owes as much to the resisting reality as to our self-produced ideas.[19]

Note the implication that some facts can be separated from some paradigms or interpretations. Summarizing Popper's views on this point, Ralph Rader asserts that:

> ...all our knowledge is inherently and permanently hypothetical, that knowledge can never begin with "the facts" but only with a conjecture about the facts, and that the test of a conjecture (read hypothesis or theory) is not the degree to which it finds confirmation in facts--the significance of which it effectively constructs--but the degree to which it risks refutation by independent facts which it does not have immediately in view. ...The more disparate the independent facts that general premises can be shown to entail, the more the premises may be assumed to reflect the actual underlying structure of the facts, and the more worthy they accordingly are to be taken tentatively as an approximation to the truth.[20]

Graff sees Popper's conjectures, buttressed by the analogous aesthetic theories of E. H. Gombrich, as showing literary critics a welcome way out of the paralysis of post-Kantian thought. While not denying, says Graff, that "literature and language are systems of humanly created conventions and not simple mirrors or photographic copies, it is now at least as important that they rescue some sense in which these conventions are accountable to something beyond themselves."[21] More important here, if Popper's conjectures provide a way out for literary theorists, they surely provide at least as viable a way out for technical discourse theorists. Thus, the recent perception of the inadequacy of the positivist's notion of a one-to-one correspondence between words and things, however valid, led theorists, in effect, to throw out the baby with the bath water. That is, the fact that the positivist's notion of the relation between technical discourse and objective reality is too simplistic and reductionistic does not mean that we need relinquish the notion of a relation. To put it another way, the post-positivist appreciation of the conventional nature of technical discourse, the post-positivist realization that technical discourse is a system of humanly created conventions, does not necessitate abandoning a truth-claim.

Given the preceding analysis, what lines of inquiry do we see as promising? In broadest terms, we see the need for research aimed at a more theoretically based, contextual definition of technical writing. Such a definition would necessitate abandonment of the quest for an essentialistic definition; it would avoid an a priori privileging of technical writing, and would evolve from creative and systematic attempts to see technical writing in relation to other forms of discourse and modes of representation. The proposed research approach would transcend the one-on-one, i.e., discipline-by-discipline or feature-by-feature, approaches characteristic of previous attempts at definition.[22] This approach would also lead

to a more balanced treatment of shared and distinguishing features of technical writing. Technical writing would be viewed, not as a set of unique specialized skills practiced by a professional elite, but as one of a series of discursive possibilities for perceiving and organizing reality. Ultimately, in the broad perspective proposed, technical writing would be seen, not as an hypostasized autonomous entity alienated from the community of discourses to which it rightfully belongs, but as an interdiscursive nexus of features.

Only from such a broad and comparative perspective can one meaningfully pose the question of the distinctiveness of technical writing. Hopefully, the comparative study proposed will avoid trivializing its own endeavor. It will, rather, establish distinctive ways in which various discourses can sustain truth-claims and will yield bases for distinguishing technical from other types of discourse. This seems a reasonable expectation. After all, "resisting reality" tells us that technical discourse *is* different from other discourse. Ultimately, though, we must establish the theoretical basis of a new truth-claim for technical discourse. In the quest for a contextual definition of technical writing, there is much to be done.

FOOTNOTES

[1] Dwight W. Stevenson, "Mapping the Unexplored Area: Developing New Courses and Coherent Programs in Technical Communication," *Journal of Technical Writing and Communication* 8, no. 3, 1978, pp. 193-206.

[2] Stevenson, "Mapping the Unexplored Area," p. 193.

[3] F. E. Sparshott, "On the Possibility of Saying What Literature Is," *What is Literature?*, ed. Paul Hernadi (Bloomington: Indiana University Press, 1978), pp. 13-14.

[4] Ben F. Barton and Marthalee S. Barton, "What is Technical Writing? Prolegomenon to a Contextual Definition," *Technical Communication: Perspectives for the Eighties*, NASA Conference Publication 2203 (Hampton VA:NASA, 1981), pp. 3-13.

[5] See, for example, James W. Souther, "What's New in Technical Writing," *English in Texas*, 11, no. 4 (Summer 1980), p. 79: "Technical writing, like fiction or journalism, is a separate discipline, a unique kind of writing."

[6] Jürgen Habermas, "Technology and Science as 'Ideology'," *Toward A Rational Society: Student Protest, Science and Politics* (Boston: Beacon Press, 1970), pp. 81-122; Herbert Marcuse, *The One-Dimensional Man* (Boston: Beacon Press, 1964).

[7] Stanley Aronowitz, "Mass Culture and the Eclipse of Reason: The Implications for Pedagogy," *College English*, 38, no. 8 (April 1977), p. 772.

[8] S. Michael Halloran, "Eloquence in a Technological Society," *Central States Speech Journal*, 29, Winter 1978, pp. 221-27, especially p. 224.

[9]For a discussion of the notion of "images," see Kevin Lynch, *The Image of the City* (Cambridge: MIT and Harvard University Presses, 1960). For the notion of "cognitive maps," see Edward C. Tolman, "Cognitive Maps in Rats and Men," *The Psychological Review* 55, no. 4 (July 1948), pp. 189-208. The term "schemata" is, of course, most notably associated with Piaget.

[10] Gerald Holton, *Concepts and Theories in Physical Science* (Reading MA: Addison Wesley, 1952), p. 650.

[11] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2nd. ed. (Chicago:

University of Chicago Press, 1970), p. 121.

[12] Andrew J. Weigert, "The Immoral Rhetoric of Scientific Sociology," *The American Sociologist* 5, no. 2 (May 1970), p. 112.

[13] Gerald Graff, *Literature Against Itself: Literary Ideas in Modern Society* (Chicago: University of Chicago Press, 1979).

[14] Graff, p. 29. The reference to trivalization occurs on p. 28.

[15] Graff, p. 26.

[16] Graff, pp. 18-19.

[17] Graff, p. 20.

[18] Graff, p. 28.

[19] Karl Popper, *Objective Knowledge: An Evolutionary Approach* (London: Oxford University Press, 1972), p. 68, note 31.

[20] Ralph W. Rader, "Fact, Theory, and Literary Explanation," *Critical Inquiry* 1, no. 2 (December 1974), p. 245.

[21] Graff, p. 205.

[22] Barton and Barton, "What is Technical Writing?".

THE PROFESSIONAL WORK STATION AND INFORMATION MANAGEMENT

FUTURE DIRECTIONS FOR RESEARCH

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Our purpose today is to address the issue of needed research on the impact of the personal computer, or professional work station, on methods of information management. Admittedly, there has been until recently no essential change in the methods of managing information in the professional world. Describing the methods of managers, for example, Henry Mintzberg wrote in 1975:

> I was struck during my study by the fact that the executives I was observing -- all very competent by any standard -- are fundamentally indistinguishable from their counterparts of a hundred years ago (or a thousand years ago, for that matter). The information they need differs, but they seek it in the same way -- by word of mouth. Their decisions concern modern technology, but the procedures they use to make them are the same as the procedures of the nineteenth- century managers. Even the computer, so important for the specialized work of the organization, has apparently had no influence on the work procedures of general managers.[1]

Mintzberg is talking about *managers*, but the stasis in information-management methods has blanketed the professions and traces to their continued reliance on the oral/print mode.

But a radical shift to the "electronic/video" mode of information management is already underway under the impact of modern technology, in general, and the personal computer, in particular. Why will the microprocessor-based personal computer, or professional work station, have an impact which, as Mintzberg noted, the time-shared mainframe computer did *not* have? In part, this impact is due to dramatic improvements in the cost, size and performance capabilities of computing machinery – a result of the microelectronics revolution. To quote from the now classic 1977 article by Robert Noyce:

> An individual integrated circuit on a chip perhaps a quarter of an inch square can now embrace more electronic elements than the most complex piece of electronic equipment that could be built in 1950. Today's microcomputer, at a cost of perhaps $300, has more computing capacity than the first large electronic computer, ENIAC. It is twenty times faster, has a larger memory, is thousands of times more reliable, consumes the power of a light bulb rather than that of a locomotive, occupies 1/30,000 the volume and costs 1/10,000 as much.[2]

By now, Noyce's dramatic figures are, in fact, conservative; moreover, the future promises equally striking developments: Today's microprocessor will be succeeded well within the decade by the "nanoprocessor," a unit of similar size with a thousand-fold greater computing capability.

Yet the emphasis on increasing performance capabilities, however productive, is far less important in explaining the impact of personal computers in the business world than the recent emphasis on facilitating the use of whatever capability is there. In this new approach, the user is no longer assumed to be a computer expert but, rather, a novice, a user without programming proficiency. In the jargon of the trade, the personal computer is designed to be "user-friendly." Moreover, unlike the large general-purpose computer, the personal computer is customized to perform conveniently for the newly envisioned users a specific set of information-management tasks other than the data manipulation, or "number crunching" for which, ironically, the so-called "general-purpose" computer was primarily suited. Among the tasks for which a personal

computer may be customized are scheduling, information storage and retrieval, electronic mail, message handling, copying, text processing and printing, conferencing, computer-aided design, and graphics production. Customizing for selected tasks is accomplished with appropriate special-purpose hardware and prepackaged software (or programs) designed to minimize the need for programming skills. Such software permits operation not by typing in sequences of intricate commands couched in computer jargon but, rather, by following the principle of "progressive disclosure" whereby the user need only designate one of a set of easily understood options available at each step of a given task. In fact, the user typically need only press a single key, or touch a single display item, to specify the next step.[3] Moreover, only a *few* such easy steps are required to complete the tasks for which the computer is customized.

Recent developments in computer technology are thus placing personal computers at the elbows of professionals. The implication of this trend is a dramatic shift in the mode of information management in the professional world. This is the new world we must prepare our students for; this is the world our research must address if we are to continue to fulfill our traditional charge of bridging the gap between student and professional. What do we consider profitable lines of inquiry for the technical-communications specialist to pursue? Our purpose here is neither to point out the many areas of immediate research need, nor to propose a research program in any detail. Rather, we wish to emphasize the importance of recognizing and examining the assumptions that inevitably underlie whatever research is undertaken. In the case of interest here, the significance of research in the information-management area will be limited, in the last analysis, by our conception of the nature and significance of the new electronic information-handling technologies embodied most dramatically in the personal computer. It is too easy, for example, to underestimate

the profundity of the shift to the electronic/video mode. In one comfortable coping strategy, the new technology is seen simply as an extrapolation of the old. From such a perspective, the electronic/video output is viewed simply as a variation on, an outgrowth of, the traditional paper-based text. Similarly, the text processor would be, and has been, seen as simply a glorified typewriter--much, it is argued, as the electric typewriter is an upgraded mechanical typewriter. But analogizing between the two technologies may implicitly mask the radicalness of the mode shift, may prevent us from seeing the distinctiveness of the new mode, and may ultimately limit our perception of its potential. For that matter, mere retention of the terminology of an older technology can signal an allegiance to a conceptual framework that may no longer be appropriate. Reference to an "electronic *page*," for example, provides an insidious basis for value judgements that may be unwarranted. A personal computer displaying "only half a page," such as the Xerox 820, is consigned to inferiority through an implicit comparison with a book.

Yet if we are truly on the threshold of the much-touted revolutionary electronic office, such comfortable coping strategies -- however useful initially -- will ultimately prove inadequate. Surely many implications of the mode shift in information management are not fully understood. Many questions remain unanswered; others are unasked. Consider, for example, the ease with which imagistic displays are produced with personal computers. Will such facility with graphics lead to wider representation of information in imagistic forms? What, in turn, are the implications of a shift toward the imagistic mode, which is by nature more holistic and synthetic? We may well see a radical change in the nature of the problem-solving methodology itself, which has traditionally been linear and analytic. Changes in the problem-solving methodology may also be induced by other innovations associated with the personal computer. Consider

the recent extension of computer-aided design (CAD) to include computer-aided manufacturing (CAM). When, thanks to CAD/CAM, one engineer is involved in the whole process from research through design, development, prototyping, setting of specifications and manufacture, the traditional tendency toward local optimization, i.e., optimization at each step in the process, is no longer viable. That is, the individual engineer must live more directly with the implications of decisions at every step. Surely this will lead to a more holistic view of the entrepreneurial enterprise.

Will such tendency toward holism be thwarted, on the other hand, by other characteristics of the computer? For some implications of the mode shift may trace to the most basic quality of the personal computer, i.e., to its *digital* nature. Consider the equality of status, in the computer, of the individual bit (binary digit , 0 or 1)—in effect, of the yes-or-no answer to an elemental question, whatever the significance, e.g., social value, of the question or the answer. What is the significance of such *democratization* of data, particularly in light of the explosion in the quantity of data available in computers? Will there not be a premium on meaningful information-processing capability in such a situation? The answers to such questions are critical to technical-communication faculty for whom the ultimate research question is "What is really meant by literacy in the new information-management mode?" As Theodore Lowi warns, "while many will learn to use the new apparatus, only a few will understand it... . Many will *know how;* some will *know.*[4] Clearly, our primary research charge is to understand what it means to *know* in the new mode. Only then can we see the implications of the newest of technologies for the oldest of pedagogical questions: How do we *teach* our students to *know*?

FOOTNOTES

[1] Henry Mintzberg, "The Manager's Job: Folklore and Fact," *Harvard Business Review 53*, no. 4, (July-August 1975), p. 54.

[2] Robert N. Noyce, "Microelectronics," *Scientific American* 237, no. 3 (September 1977), p. 65.

[3] Command mechanisms vary from system to system. The Xerox 8010 (Star) executive work station provides a "mouse" -- a palm-sized "creature" attached to the console by a thin wire "tail" -- that is moved on a working surface by the user to direct a "cursor," or pointer, to a chosen element on the video display. In other systems, cursor position is controlled with the keys of a keypad next to the keyboard. Other systems provide a "light pencil," in effect, a narrow-beamed flashlight; a switch on the light pencil is actuated by the user while the beam is pointed at the chosen element on the display. In still other systems, the user indicates a choice by touching the appropriate element on the display. Experimental voice-actuated systems respond to a list of command words spoken by a user whose voice the system has been "trained" to recognize.

[4] Theodore J. Lowi, "The Political Impact of Information Technology," in *The Microelectronics Revolution: The Complete Guide to the New Technology and Its Impact on Society*, ed. T. Forester (Cambridge, Mass.: The MIT Press, 1981), p. 469.

NEW DIRECTIONS FOR STUDY IN TECHNICAL COMMUNICATION: A RESPONSE

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When Mary Coney and I first talked about my being a participant on the panel "New Directions for Graduate Study in Scientific and Technical Communication Programs," I was supposed to discuss the following questions: 1) Is there an adequate theoretical framework to support the research and curricula for the new explosion of technical communication courses? 2) Do graduate programs need to increase their ties with other disciplines or establish academic bases of their own?

Since, however, the other papers presented on the panel focus primarily on the first question, my role has become that of respondent to the discussion of that question.

The question, by implication, seems to ask for a definition of technical communication. Are we to discuss the question from a purely pedagogical standpoint? Or, in fact, does it once again by implication ask us if we should reexamine our reason to be?

I have my own answers to these questions, but Marthalee Barton, in her presentation on "How Not to Theorize about Technical Discourse: The Lesson of Literary Theory," has provided us a good historical

perspective of the question and her own answers. And Ben Barton, in his presentation on "The Professional Work Station and Information Management," has offered us as teachers and practitioners of technical communication an idea of some of the challenges facing us as we move more and more into the use of computers for information storing and processing. In so doing, he also responds to the implications of the first question. As respondent, I will address Marthalee's presentation first, add a few of my own ideas, then respond to Ben's presentation.

Marthalee first gives us some history of attempts to define technical discourse and the limitations of those attempts. For example, literary theorists attempt to define it but they "focus on literary, rather than on technical, discourse." On the other hand, technical writing theorists' attempts to define technical discourse are "aimed at providing a basis for pedagogy." And ultimately all definitions of technical discourse have tended to alienate it from composition and rhetoric.

Those definitions of technical discourse which emphasize its distinguishing rather than its shared features alienate it from traditional composition and traditional rhetoric and align it with scientific positivism. That is, technical discourse, by association with positivism, "involves an objective presentation of the facts." If technical discourse abandons this alignment, Marthalee suggests, it swings to an opposite but equally alienating alignment with post-positivists. Technical discourse now becomes associated with the theory that there is no truth in scientific observation and that what it relates is ultimately fiction.

What are the alternatives to these alignments and to this alienation of technical discourse? Marthalee urges us to seek a "contextual definition of technical writing," to abandon the "quest for an essentialistic

definition," "avoid an a priori privileging of technical writing," and seek a definition which "would evolve from creative and systematic attempts to see technical writing in relation to other forms of discourse and modes of representation."

My own definition of technical communication is, I believe, contextual. Technical communication is defined by the two controlling words in its name: "technical" and "communication." Technical defines the subject matter, whatever that subject may be, which is to be communicated. "Communication" then refers to putting the subject matter into the most appropriate medium, or media, with the most appropriate format, organization, language, and mechanics. Within this definition, "appropriate" means that the communication achieves its purpose. "Purpose" means giving the intended audience exactly the information they need in the most accessible and usable way.

This definition is dependent upon all kinds of research within any related discipline. Technical communication, therefore, has a strong and supportive theoretical framework. We have the knowledge provided by all preceding studies in the technologies and sciences, and we have all prior studies in all fields of communication. We need only continue to take the best from those studies, develop them, and continue to remain a progressive discipline.

Ben Barton, in his presentation, also discusses this idea of progressivism in technical communication. As he discusses the importance of the computer upon information management and processing he makes two points to which I'd like to call particular attention.

First, the use of the computer creates a communication situation in which the writer can work with each stage of information processing

in relationship to all other stages. This frees the writer from seeing writing as a linear process.

Second, the communicator has much more information available and the communicator's responsibility for handling that information is much greater. To meet the responsibility, the communicator needs to understand the various modes of information management.

Ultimately, the possibilities of information management and processing provided by the developments in the computer industry are yet another challenging area of study and increase our responsibilities as educators. Perhaps, though, the computer will allow us as educators and communicators to focus on our real work of getting information to users as quickly and efficiently as possible without becoming muddled in the mechanics of trying to create and process without the proper tools.

Has the question whether there is an adequate theoretical framework to support the research and curricula of technical communication courses been answered in this panel discussion? I doubt it. But having asked the question and having discussed some possible answers has proved again that technical communication is a discipline which does not lack for challenging questions; nor does it lack for people to ask those questions and seek answers.

ANNUAL BUSINESS MEETING

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SECRETARY'S MINUTES FOR 1982

The Annual Business Meeting of the Council for Programs in Technical and Scientific Communication was held in the Board Room at Carnegie-Mellon University in Pittsburgh, Pennsylvania, on 16 April 1982, beginning at 10:45 a.m., with the President, David L. Carson, presiding.

Old Business

The Vice President and Editor, Virginia A. Book, noted that only a few copies of Proceedings 1981 of the Council for Programs in Technical and Scientific Communication remained and that Proceedings 1982 will include the amended Constitution of the Council. Book was praised by the Council for the handsome Proceedings 1981.

The Treasurer, Carolyn R. Miller, presented the treasurer's report. The balance in the treasury was $1,097.87. During the year, 57 members paid dues.

President Carson spoke briefly about his tenure in office and about the changes in the Council during recent years, especially the increased number of women in the teaching of technical and scientific communication, as reflected by the Council at this meeting.

Carson advised the Council of the desire to remain small and informal and therefore warm and personal.

Carson recommended that the incoming Executive Committee revise the Council's directory of programs in technical and scientific communication. A lengthy discussion followed about the differences between STC's Directory of Academic Programs in Technical Communication and the Council's directory. The consensus was that the Council's directory should be fuller so that it is more useful than STC's directory to directors and coordinators of programs in technical and scientific communication, to teachers and students in these programs, and to the employers of graduates of these programs. William O. Coggin moved that the Executive Committee revise the Council's directory. Mary B. Coney seconded the motion. The motion passed.

Paul V. Anderson spoke briefly about Writing Program Administrators and about the possibility of the Council's cooperating with the work of this organization, including its team examinations of programs. Patrick M. Kelley moved that Anderson serve as the Council's liaison with the organization. Carol S. Lipson seconded the motion. The motion passed.

Coggin announced a new publication, Interchange, an STC newsletter for students, at Bowling Green State University. Urging the Council to inform students of the publication, Coggin proposed to send a copy of the

publication to each member at the meeting. He was praised by the Council for the enterprise of his students.

Book and Miller inquired about establishing archives for the Council. Carson suggested the possibility of Thomas E. Pearsall's establishing archives at the University of Minnesota. Sam C. Geonetta suggested ERIC. Miller moved that Pearsall be asked to establish archives, index the contents, and make the contents available to the members of the Council and others. Roger E. Masse seconded the motion. The motion passed.

New Business

To nominate a slate of new officers, ballots were sent earlier to members of the Executive Committee. This slate was nominated:

President:	Virginia A. Book
Vice President:	Patrick M. Kelley
Secretary:	Carolyn R. Miller
Treasurer:	Victoria M. Winkler
Member at Large:	Sam C. Geonetta

Anderson moved that the Council accept the slate. Barbara A. Smith seconded the motion. The motion passed.

Miller requested that her name be withdrawn as a candidate for secretary. The Executive Committee, Anderson, and Smith accepted her withdrawal with regret. Kelley then nominated JoAnn T. Hackos for secretary. Hackos accepted the nomination.

Anderson then nominated Marilyn S. Samuels for treasurer. Samuels accepted the nomination.

Hackos moved that the nominations be closed. Andrea C. Walter seconded the motion. The motion passed.

The Council elected this slate by secret ballot:

President:	Virginia A. Book
Vice President:	Patrick M. Kelley
Secretary:	JoAnn T. Hackos
Treasurer:	Marilyn S. Samuels
Member at Large:	Sam C. Geonetta

A lengthy discussion followed about who should elect the officers, the members who are present at the meeting of the Council--the current procedure--or the membership of the Council at large. Anderson moved that the incoming Executive Committee consider revision of the current procedure in light of the discussion. Coney seconded the motion. The motion passed.

Anderson moved that the Council thank Beekman W. Cottrell and Carnegie-Mellon University for hosting the meeting and that the Council

thank the outgoing officers for serving. Coggin seconded the motion. The motion passed, supported by strong applause.

Carson reminded the Council that it will meet in 1983 at the University of Nebraska in Lincoln, Nebraska, with the meeting hosted by Book.

Anderson requested that the Council meet in 1984 at Miami University in Oxford, Ohio. Kelley requested that the Council meet in 1984 at New Mexico State University in Las Cruces, New Mexico. Walter requested that the Council meet in 1984--or at some later date--at Rochester Institute of Technology in Rochester, New York. The Council voted to meet in 1984 at New Mexico State University in Las Cruces, New Mexico.

Geonetta, seconded by Helen M. Loeb, moved for adjournment. As the motion passed, the meeting adjourned at 12:45 p.m.

Respectfully submitted,

Beekman W. Cottrell

Beekman W. Cot rell
Secretary

TREASURER'S REPORT FOR 1981-82

This report on the treasury of the Council for Programs in Technical and Scientific Communication was current as of 16 April 1982, the date of the Annual Business Meeting.

Credits	
Balance brought forward from before meeting in 1981	$673.36
Memberships: 31 renewals + 26 new = 57 x $15.00	855.00
Interest	42.41
Sales of Proceedings: 6 @ $5.00	30.00
	1,600.77
Debits	
Supplies (receipt books, wine, M. White's expenses, restaurant reservation)	110.92
Publication of Proceedings 1981 (Univ. of Neb.)	
Cover Art	70.00
Printing	270.38
Postage	51.60
Balance	$1,097.87

Respectfully submitted,

Carolyn R. Miller

Carolyn R. Miller
Treasurer

APPENDICES

APPENDIX A: CONSTITUTION

(As Amended 1981)

ARTICLE I
NAME:

The name of the organization shall be Council for Programs in Technical and Scientific Communication.

ARTICLE II
PURPOSE:

The primary purposes of the organization shall be to (1) promote programs in technical and scientific communication, (2) promote research in technical and scientific communication, (3) develop opportunities for the exchange of ideas and information concerning programs, research, and career opportunities, (4) assist in the development of new programs in technical and scientific communication, and (5) promote exchange of information between this organization and interested parties. Said organization is organized exclusively for educational purposes.

ARTICLE III
MEMBERSHIP:

Membership shall be open to any individual or institution interested in supporting the purposes identified in Article II. Individuals or institutions whose primary responsibilities or functions are education shall be designated Regular Voting Members. Others shall be designated Special Non-Voting Members. Membership shall be open to any person without regard for race, age, sex, or religious affiliation.

ARTICLE IV
OFFICERS:

The officers of the organization shall be president, vice-president, secretary, and treasurer, each to be elected for a two-year term.

The duties of the officers shall be:

President:
1) preside at the annual national convention of the organization.
2) represent the organization at official functions.
3) serve as chairman of the executive committee.

Vice President:
1) perform all the duties of the president in the event of the president's absence.

Secretary: 1) maintain all records of the organization including matters of correspondence.

Treasurer: 1) handle all financial matters of the organization including the receiving and recording of dues and payments and paying the bills of the organization.
2) maintain an up-to-date membership list.

The president, vice president, secretary, and treasurer, plus the immediate past president and one member-at-large, elected by the membership, shall serve as an executive committee. The executive committee shall have the right to act on the behalf of the organization at such times as the organization is not meeting in full assembly except to change the constitution or carry out elections.

ARTICLE V
LIMITS:

No part of the net earning of the organization shall inure to the benefit of, or be distributable to its members, trustees, officers, or other private persons, except that the organization shall be authorized and empowered to pay reasonable compensation for services rendered and to make payments and distributions in furtherance of the purposes set forth in Article III hereof. No substantial part of the activities of the organization shall be the carrying out of propaganda, or otherwise attempting to influence legislation, and the organization shall not participate in, or intervene in (including the publishing or distribution of statements) any political campaign on behalf of any candidate for public office. Notwithstanding any other provision of these articles, the organization shall not carry on any other activities not permitted to be carried on (a) by a corporation exempt from Federal income tax under section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law) or (b) by a corporation, contributions to which are deductible under section 170 (e) (2) of the Internal Revenue Code of 1954 (or corresponding provision of any future United States Internal Revenue Law).

ARTICLE VI
MEETINGS:

The organization shall meet in full convention annually. The location of the annual meeting shall be determined by vote of assembly at the preceding convention. The approximate date of the meeting shall also be established.

Special meetings of the organization may be held at need as determined by the executive committee.

ARTICLE VII
FINANCES:

The dues for the organization shall be $15.00 per year for Regular Voting Members and $50.00 for Special Non-Voting Members. All dues are payable prior to or upon registration at the annual meeting.

ARTICLE VIII
ELECTIONS:

The election of officers and members-at-large to the executive committee shall be held at the annual meeting. The existing executive committee shall each year nominate a slate of officers and a member-at-large and have this slate in the hands of the membership 30 days before the annual meeting. Nominations will also be allowed from the floor at the annual meeting. Elections shall be by written ballot.

ARTICLE IX
CONSTITUTIONAL
AMENDMENT:

This constitution shall be amendable by a two-thirds vote of the assembly present and voting at the annual meeting. Proposed amendments to the constitution must be in the hands of the members at least two months in advance of the annual meeting at which the vote is to be taken.

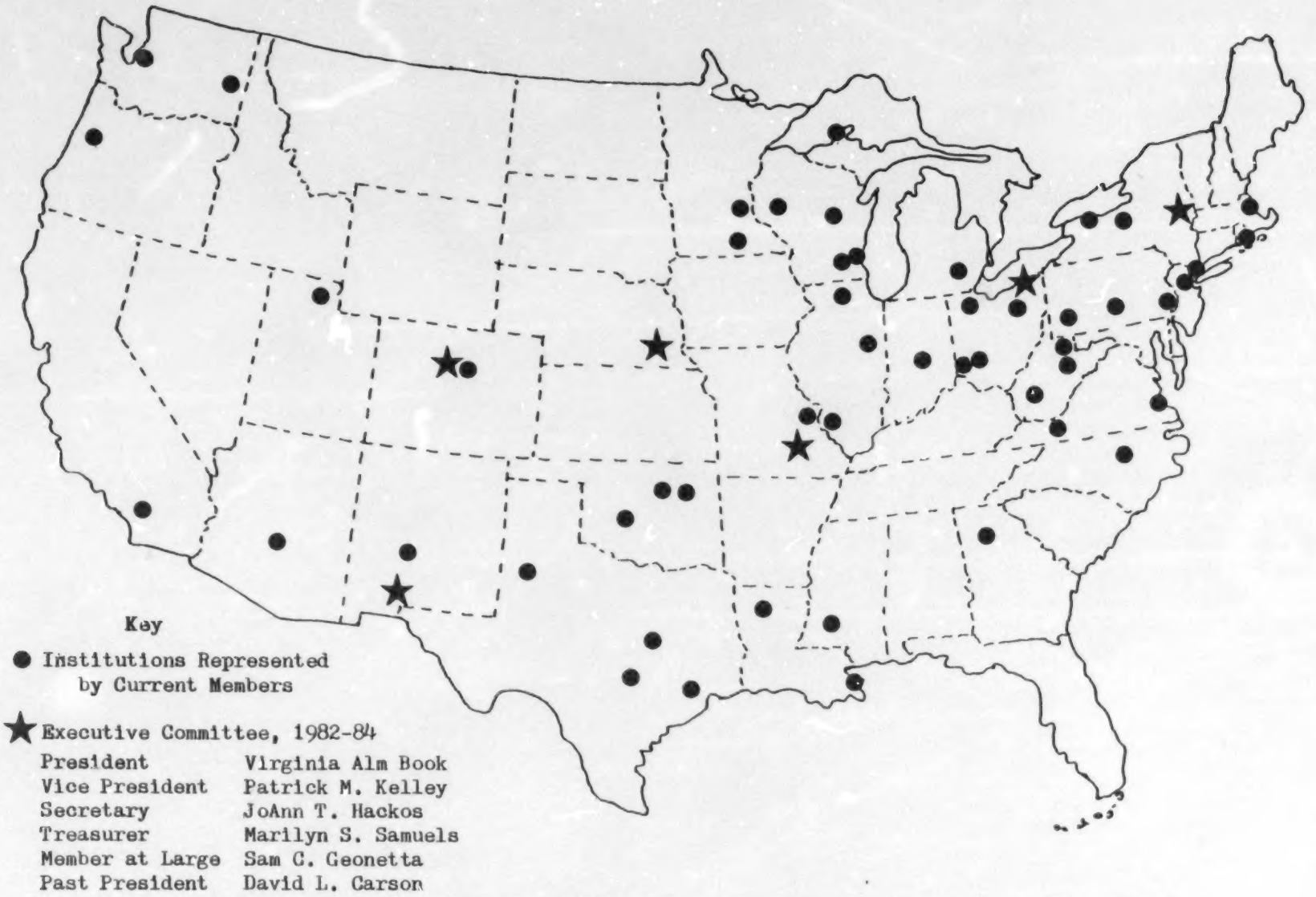
ARTICLE X
DISSOLUTION:

Upon the dissolution of the organization, the Board of Directors shall, after paying or making provision for the payment of all of the liabilities of the organization, dispose of all of the assets of the organization exclusively for the purposes of the organization in such manner, or to such organization or organizations organized and operated exclusively for charitable, educational, religious, or scientific purposes as shall at the time qualify as an exempt organization or organizations under section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law), as the Board of Directors shall determine. Any such assets not so disposed of shall be disposed of by the Court of Common Pleas of the county in which the prin-

cipal office of the corporation is then located, exclusively for such purposes or to such organization or organizations, as said Court shall determine, which are organized and operated exclusively for such purposes.

ARTICLE XI
PARLIAMENTARY
AUTHORITY:

All official meetings, of the organization, shall be conducted according to the Standard Code of Parliamentary Procedure by Alice B. Sturgis. The presiding officer shall appoint a parliamentarian to advise the assembly at each annual meeting.


Key
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Executive Committee, 1982-84
President Virginia Alm Book
Vice President Patrick M. Kelley
Secretary JoAnn T. Hackos
Treasurer Marilyn S. Samuels
Member at Large Sam C. Geonetta
Past President David L. Carson

APPENDIX B: EXECUTIVE COMMITTEE AND INSTITUTIONS REPRESENTED BY CURRENT MEMBERS

APPENDIX C: CURRENT MEMBERS

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